The Worlds of Villard de Honnecourt: The Portfolio, Medieval Technology, and Gothic Monuments

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The Worlds of Villard de Honnecourt: The Portfolio, Medieval Technology, and Gothic Monuments

Edited by

George Brooks and Maile S. Hutterer

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Cover illustration: Portfolio of Villard de Honnecourt, fols. 15v, 21v, 7v, and 5r, details: west facade rose of the Cathedral Notre-Dame of Chartres, Wheel of Fortune, labyrinth, and perpetual motion device (Paris, Bibliothèque nationale de France, MS fr. 19093). Reproduced by permission of the BnF

The Library of Congress Cataloging-in-Publication Data is available online at https://catalog.loc.gov

Typeface for the Latin, Greek, and Cyrillic scripts: "Brill". See and download: brill.com/brill-typeface.

ISSN 2634-4750
ISBN 978-90-04-52909-0 (hardback)
ISBN 978-90-04-52910-6 (e-book)

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Notes on Contributors

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Carl F. Barnes Jr†
(1935–2012) was professor emeritus of art history at Oakland University in Rochester, Michigan, where he taught from 1971–2001. He was a student of Robert Branner, and his early work focused on Soissons Cathedral. Barnes published widely on many aspects of medieval art and Gothic architecture, in such scholarly publications as *Art Bulletin*, *AVISTA Forum Journal*, *Gesta*, *Journal of the Society of Architectural Historian*, *Manuscripta, Scriptorium*, and *Speculum*. Early in his career, at the suggestion of Branner, Barnes took up the question of the profession of the author of the Villard de Honnecourt manuscript (BnF, MS fr 19093) which would become the dominant theme in his career, and the one for which he is most famous. Barnes gathered every significant scholarly publication on Villard and summarized their arguments in *Villard de Honnecourt—The Artist and His Drawings: A Critical Annotated Bibliography* (1982), and then maintained its currency with an online site which was available to scholars. Having digested over a century of discussion on Villard and applying his own formidable paleographic skills to the original manuscript which he twice examined, Barnes concluded that the author of the manuscript provided no evidence of having been an architect or master mason as he was assumed to be since the rediscovery of the manuscript in the 19th century. Barnes laid down the gauntlet with an essay, "Le 'Problème' de Villard de Honnecourt," which outlined ten reasons that rebutted this assumption. Over the course of the last quarter of the 20th century, Barnes's view slowly won over most

scholars in the field, most of whom have adopted his designation for the manuscript, dropping the traditional "sketchbook" as it had long been known to English speaking scholars, and instead applying "portfolio" as a more appropriate description. Near the end of his life, having become the premier Villard scholar of his era, he assembled his career-long investigation into a beautiful facsimile edition: *The Portfolio of Villard de Honnecourt: A New Critical Edition and Color Facsimile* (2009), which was the first facsimile to publish every page of the manuscript in full color and at the original size. Carl Barnes was a founding member of AVISTA and served as its president (1990–91).

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John James
PhD OAM, trained in architecture and art history at Melbourne, and for 13 years practiced in Sydney as both architect and builder. James began an on-site analysis of Chartres Cathedral in 1969 and has since published a dozen books on medieval architecture and sculpture, and over a hundred articles. He surveyed the churches of northern France, visiting all those with structures erected before 1240, and drew their forms and profiles. From the survey he published *The*

Template-makers of the Paris Basin to demonstrate medieval building methods. He resurveyed most of these buildings many times to photograph the capitals, which he published in the five-volume *Ark of God*. From this he built the creationofgothic.org (COGA) site to share the data he had gathered and as a tool for analyzing the men who carved the capitals. He has used the carving manner of the capitals to date them in a more precise way than the usual casual approximations. He is currently writing the history of the Chartres westwork that completes his analysis of the cathedral begun over 50 years ago. His objective has been to identify the individuals who created the greatest and most endearing architecture of all time.

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architecture, her work has explored the viewer's experience of images in space, architecture and the cult of saints, and women's roles in the creation of Gothic buildings. She chaired the editorial committee of AVISTA from 2001 to 2011, and currently serves as Vice President of the International Board of the Corpus Vitrearum and advisor to the American Friends of Chartres.

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une Force Créatrice à Reims," in Patrick Demouy, dir., *La Cathédrale de Reims* (2017); "Retracing the Original North Transept of Reims Cathedral," in Jennifer M. Feltman, ed., *The North Transept of Reims Cathedral: Design, Construction, and Visual Programs* (Routledge, 2016); "Roriczer, Schmuttermayer, and Two Late Gothic Portals at The Cloisters," in Kathleen Nolan and Dany Sandron, eds., *Arts of the Medieval Cathedrals: Studies on Architecture, Stained Glass and Sculpture in Honor of Anne Prache* (Burlington: Ashgate, 2015), 71–90; and *The Cloisters: Medieval Art and Architecture* (2005/12) which she coauthored with Peter Barnet. More recently she has embarked on a new project examining the experience of Franciscan missionaries in 14th-century China, a topic she has presented at the Medieval Academy of America's annual conference in 2021 and 2022.

Introduction

George Brooks and Maile S. Hutterer

AVISTA, *The Association Villard de Honnecourt for the Interdisciplinary Study of Medieval Technology, Science, and Art*, is a scholarly society whose membership shares a common fascination with the materials and applied technologies used by medieval people. These industrious individuals operated within a number of intersecting spheres of knowledge—distinct "worlds"—each with its own highly developed principles and practices. These include the worlds of the medieval mason, steeped in practical geometry, drafting, and the mineral properties of stone; the carpenter, trained in the properties of wood for constructional, functional, and ornamental purposes; the engineer, concerned with motion, energy transfer, and automation; and the artist who worked with pigments, knowledge preservation, and representational conventions. Villard de Honnecourt's Portfolio evidences his engagement with these spheres and others. The present book similarly seeks to explore some of the different ways that medieval people created, extended, and employed knowledge. In the contemporary parlance of the modern university, such endeavors might fall under the labels of "applied science." These are the skills and practices that crafted the objects and environments of medieval life—the application of learning to daily life.

AVISTA is the academic home of all those who are intrigued by the medieval tradespeople who left few written records, but whose manual labors left the indelible marks of a great age expressed through craft skill and artistry. As such, AVISTA has of necessity, from its very inception, been an interdisciplinary endeavor. Without conveniently surviving treatises to dissect, historians of medieval technology and art must avail themselves of evidence of many types and be willing to approach their subject from a variety of directions. To take but one example: when studying the role of medieval watermills—for which there is no such thing as a detailed written document from a medieval person who knew how to build one—the researcher might examine their depictions in manuscript marginalia, comb through charters granting the rights to build one, or seek out references to legal procedures against peasants who tried to evade the taxes of using their landlord's mill. Our researcher might attempt to count the number of watermills in rare documents like *Domesday Book*, wrestle with questions of terminology for machine elements in an age before a standardized vocabulary had been invented, pour over the reports of archeologists whose field work has uncovered evidence of mills' existence, or ponder the

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occasional allegorical usage of them in literature and the evidence of the lives of their users in such works as Chaucer's *Miller's Tale*. Finally, our researcher might learn something of basic mechanics—sometimes building models to test ideas—to understand how the machines may have been built and used by medieval people and to find out how they worked in terms of modern science and engineering. Thus, the work of art historians, paleographers, linguists, archeologists, literature professors, and technicians all must be brought together to triangulate (or perhaps, "hexangulate") on the medieval machine.

The example of the watermill is not chosen at random. *The Medieval Machine: The Industrial Revolution of the Middle Ages*, published in 1976 by Jean Gimpel, gave special focus to the role of watermills in the development of technologically driven industry in the European Middle Ages, and is in many ways the most significant book in the history of the field. While nearly all scholars will acknowledge that Lynn White's *Medieval Technology and Social Change* (1962) established "medieval technology" as a discipline within the field of medieval studies, especially or at least in English,[1] it is Gimpel's more impassioned book that introduced many of its current practitioners to the subject as undergraduates in medieval history courses. In Gimpel's hands, the development of medieval technological prowess unfolded as an inspiring drama, providing for first readers the astounding unknown medieval origins of modern, western industrial might. His narrative is one of heroic achievement in the harnessing of mechanical ingenuity to alleviate drudgery and push humanity progressively forward—a vision that White had promulgated, but Gimpel championed and further popularized. Having established the mechanical foundations of medieval industry, he then turned to an account of the 13th-century "architect" Villard de Honnecourt. Villard was the only person in the era of Gothic cathedral construction who managed to leave behind a manuscript that, if not quite a treatise, revealed in its images and brief inscriptions glimpses of the career of someone who had practiced both art and engineering in the heyday of Gothic architecture. This manuscript also included dozens of other drawings that attest to the voracious intellectual appetite of the builders who participated in the rich artistic and technological experimentation of the high Middle Ages. His final chapters carried their story to the ultimate expression of medieval technology: the mechanical clock—the first all-metal precision instrument that would become the very emblem of modern western

1 For a detailed examination of the role played by White's seminal work see Steven A. Walton, "Introduction," *Fifty Years of Medieval Technology and Social Change*, 1–15 (New York: Routledge, 2020).

civilization.[2] By the time his final chapter carried the story to the edges of the Italian Renaissance, Gimpel had made clear to his reader that the intellectual and technological revolution had already been accomplished. For Gimpel, if engineers in the age of Leonardo da Vinci were able to achieve spectacular heights, it was only because they stood on the shoulders of medieval giants.

Jean Gimpel's work exemplifies the general shift in medieval studies that welcomed experimental archaeology, object-focused analyses, and other innovative methodologies in addition to the more traditional text-based history and literary studies. His endeavors not only inspired many medievalists-in-training to the field of medieval technology, but he also founded the society in which they would find a home, and each other. AVISTA was ultimately his brainchild, founded first as a French scholarly group of specialists in different fields of medieval studies to help him understand the Villard manuscript. Soon afterward that group spawned an American counterpart in collaboration with, among others, the aforementioned godfather of the field, Lynn White, Jr.[3] The French group never developed into an active academic society, but the American chapter has continued to grow since its inception in 1985, sponsoring multiple annual sessions at the International Congress on Medieval Studies in Kalamazoo, Michigan, occasional sessions at the International Medieval Congress in Leeds, UK, and publishing a newsletter (the *AVISTA Forum*) that later evolved into a peer-reviewed journal (the *AVISTA Forum Journal*, or *AFJ*), and finally a series of edited volumes of essays focused on various themes (*AVISTA Studies in the History of Medieval Technology, Science, and Art*).

Today, as it approaches four decades since its inception, AVISTA has transitioned from its founding members, such as Gimpel and White, to the newer generations of scholars they have inspired. Their interests expand beyond the medieval machines that particularly fascinated White and Gimpel. From its earliest days, AVISTA has attracted medieval architectural historians whose subject necessarily requires an interdisciplinary approach. A rich tradition of detailed studies of medieval architecture—especially the Gothic churches of the world in which Villard de Honnecourt lived—has emerged from this work.

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2 The notion of the mechanical clock as a symbol of Western industrial society has a long literary tradition, beginning with Lewis Mumford's observations in "The Monastery and the Clock," 12–18 in *Technics and Civilization* (1934); Jean Gimpel's aforementioned work presented as chapter 7, "The Mechanical Clock: The Key Machine," in *The Medieval Machine: The Industrial Revolution of the Middle Ages* (1976); and many others have taken up this theme—see in particular, David S. Landes, *Revolution in Time: Clocks and the Making of the Modern World* (1983).

3 Ellen Shortell, one of AVISTA's first recruits, explores this history in the second introduction to this volume.

The society's interest in the intersections of architecture and machines is exemplified in its embrace of new technology for the study of the built environment. The techniques for analyzing Gothic buildings have developed from the days in which such founding members as Carl Barnes and William Clark roamed the aisles of Soissons and Saint-Denis, Chartres and Reims, making measurements by hand and working out their geometrical schemes. In recent decades, pioneers such as Robert Bork[4] have employed increasingly sophisticated computer programs to precisely capture the complex internal geometrical logic of a floorplan, a spire, or a façade; and the late Andrew Tallon[5] achieved worldwide acclaim for his work with 3D laser scanning technology to make exceptionally precise digital models of cathedrals by compiling billions of data points into three-dimensional computer renderings. This level of precision has allowed us to visualize structural shifts, mid-construction alterations of plans, and critical weaknesses along with their clever solutions, all of which had been invisible to earlier generations of scholars. After the fire at Notre-Dame de Paris on 15 April 2019, Tallon's models were hailed as essential to the reconstruction of the cathedral. Along with the history of architecture, AVISTA's interests have expanded into collaborations with historical metalsmiths,[6] numismatists,[7] brewers,[8] and food producers.[9] Such collaborations represent the society's deeply interdisciplinary underpinnings and broad-based engagement with all facets of medieval science.

While AVISTA and its members have embraced new technologies, the tactile pleasure of walking a field with strings and sticks and hammers, laying out the scheme of a medieval church with the directly applied geometrical methods handed down by builders through the centuries, is not forgotten but has been enacted every so often at Kalamazoo during the International Congress on Medieval Studies, AVISTA's conference home, by cathedral specialists such

4 Robert Bork, *The Geometry of Creation: Architectural Drawings and the Dynamics of Gothic Design* (Farnham: Ashgate, 2011).

5 Andrew J. Tallon, "Rethinking Medieval Structure," in *New Approaches to Medieval Architecture*, ed. Robert Bork, William W. Clark, and Abby McGehee, AVISTA Studies in the History of Medieval Technology, Science, and Art 8, 209–17 (Farnham: Ashgate, 2011).

6 "Iron Smelting Demonstration (A Workshop)" conducted by Darrell Markewitz of Wareham Forge, 48th International Congress on Medieval Studies, ICMS, 9–12 May 2013.

7 "Medieval Metals and Metallurgy" (session co-sponsored by The American Numismatic Society and AVISTA), 29th ICMS, 5–8 May 1994.

8 "Mead and Ale Tastings" [co-sponsored by The Medieval Brewer's Guild] ICMS meetings from 2015–18.

9 "From Field to Table: Technologies of Food," and its related event, "Medieval Flavors: A Demonstration," 42nd ICMS, 10–13 May 2007.

as Bill Clark[10] and Jennifer Feltman.[11] Clark's keen interest in hands-on learning has resulted in workshops demonstrating stone carving techniques.[12] And some lucky attendees of the ICMS, sport pewter medallions which they cast themselves at a workshop on medieval badges conducted by Steven Walton in association with the practicing smiths of Wareham Forge.[13] AVISTA has become a premier organization for the study of medieval art and architecture, especially where technical rigor is concerned. As it looks to the future, AVISTA builds upon a tradition genuinely steeped in interdisciplinary exchange, just as its founders envisioned.

Jean Gimpel named this organization after his medieval hero: Villard de Honnecourt. Villard is known to us only through the images and inscriptions on 33 parchment leaves bound in a pigskin case that is housed in the Bibliothèque nationale de France in Paris with the shelf mark BnF MS fr 19093. The author of much of this enigmatic object was a Picard Frenchman who most likely worked in the environs of Gothic cathedrals in the second quarter of the 13th century, but we know nothing about him beyond what we can glean from this unique manuscript. Nevertheless, Villard's multidisciplinary interests made him the ideal figure to serve as namesake and inspiration to AVISTA. The astounding collection of drawings in BnF MS fr 19093 speaks to the range of interests and skills possessed by those involved in cathedral construction: figural drawing, architectural plans, geometrical techniques, masonry, carpentry, simple and advanced machines both real and speculative, flora and fauna, and other curious details he encountered in his travels. Short inscriptions, apparently added to the folios when Villard decided to transform these records of his work into an instructional guide, accompany many of the images. These inscriptions largely (but tersely) explain a technical process or otherwise comment on drawings that Villard deemed particularly important. Gimpel's interest in Villard as a point of entry into wide-ranging investigations of medieval craft is echoed in more recent scholarship, including Stephen Murray's *Plotting Gothic* (2014).[14] Whereas Gimpel looked to Villard for his

10 "Ad Quadratum II & III: Workshop: The Layout of a Gothic Chevet Plan," 33rd ICMS, 7–10 May 1998.

11 "Learning in Action: Geometry and Cathedral Design (A Demonstration)," 53rd ICMS, 10–13 May 2018.

12 "Medieval Buildings: A Scientific Approach to Material Culture and Resources: Wood and Stone: Stone II: Techniques of Stonecarving" (Demonstration by Iris Feyler, Sculptor, and Elmar Henrich, York Univ.), 34th ICMS, 6–9 May 1999.

13 "Casting an International Congress on Medieval Studies Pilgrim's Badge (A Workshop)," 53rd ICMS, 10–13 May 2018.

14 Stephen Murray, *Plotting Gothic* (Chicago, 2014).

interest in the technical aspects of craft, Murray moves away from questions about his profession to consider what Villard's drawings can tell us about the 13th-century perceptions of these industries.

Although the level of scholarly interest in Villard remains strong, the contemporary understanding of his identity has changed considerably. What seemed like the repository of the art and ideas of a Gothic architectural genius when it first came to the attention of scholars in the 19th century, was steadily downgraded over the course of the 20th century in light of the many shortcomings of the more technical aspects of the work. The architectural drawings are flawed, the masonry instructions are likely not by Villard, and none of it looks as if it could serve as the basis of construction. Villard himself has had his status downgraded from architect, to mason, to subcontractor, to an artist only, and to merely a curious clerk. Thus, at the heart of AVISTA's mission lies an irony: while our awe at Gothic art and architecture has deepened with our increasingly sophisticated understanding of how medieval people built their world, scholarly estimation of the professional status of our namesake, originally considered to be emblematic of those architectural geniuses, has steadily declined. Villard de Honnecourt was "the Leonardo of Gothic" to the founders of this organization, but today most American medievalists have accepted the arguments of Robert Branner and especially Carl Barnes that Villard in no way possessed the technical knowledge to have been an architect or master mason. Just before his death, Barnes published his facsimile and critical commentary on BnF MS fr 19093, compiling and completing his lifetime of work which forced a rigorous and sober reassessment of this nevertheless fascinating document.[15] This culminating work of Carl Barnes now provides the starting point for future generations of scholars who will return to the many questions Barnes, and Villard, left unresolved.

1 Overview of Volume

The essays collected in this volume represent scholarship from AVISTA's past and present, and suggest future avenues of research. They come from many corners of the AVISTA community, but the bulk of them are from two sources. More recent essays are drawn from a series of sessions given at the 53rd ICMS in 2018 on "Enchanted Environs: Architecture, Automata, and the Art of Mechanical Performance." These contributions explore mechanical marvels of the

15 Carl F. Barnes, *The Portfolio of Villard de Honnecourt* (*Paris, Bibliothèque nationale de France, MS Fr 19093*)*: A New Critical Edition and Color Facsimile* (Farnham: Ashgate, 2009).

later medieval era—the kind of things that especially enthralled the founders of AVISTA—and are collected here to represent the ongoing research this organization sponsors. A complementary group of contributions are drawn from past issues of the *AVISTA Forum Journal*, which was the association's journal, published from 1986 to 2013. Newly revised and expanded, this group of essays showcases AVISTA's long history of interdisciplinary scholarship on medieval art, science, and technology. Their revised publication simultaneously corrects an unfortunate consequence of the origins of the journal as an informal newsletter. Despite having evolved into a quality, peer-reviewed journal with high production value, the vicissitudes of academic publishing (itself undergoing transformation in our recently digitized world) have affected its distribution. Because the journal was print only and only distributed to AVISTA members and member institutions, the journal was not widely collected by academic research libraries. Further, copyright limitations have prevented the society from being able to distribute digital versions of the 23 volumes. As a result, a number of significant studies in the *AFJ* never achieved their potential impact on the field. With the success of the AVISTA book series, published by Ashgate (2000–15), Routledge (2016–19), and Brill (2020-), our society's publishing model gravitated toward edited volumes, which were more readily adopted by research libraries. An unintended consequence was that numerous worthy contributions were forgotten in the twilight of the *AFJ*.

The reprinting of these essays makes this important scholarship accessible to a new generation of scholars by allowing them to be discoverable in modern databases. The volume also presents a curated historiographical sampling of scholarship that represents AVISTA's materially and archaeologically focused approach. Most essays have been updated to reflect subsequent scholarship and refine their arguments. Only one essay is reprinted without any changes: the article by Carl Barnes, "An Essay on Villard de Honnecourt and Cambrai Cathedral." Barnes's essay explores the idea that Villard was a lay brother sent by the Cambrai chapter to gather ideas for their new cathedral just beginning construction. It was Barnes's final thoughts on Villard, published in 2009 just before his death.

Because the history of AVISTA's publications is central to the genesis of the present volume, it opens with a foreword on this topic by Ellen Shortell. The organization of subtopics that follow reflects the main areas of interest pursued by our membership: the Villard manuscript or portfolio itself, medieval technology, and Gothic monuments. We must, of course, begin with a section on the Portfolio, BnF MS fr 19093—the medieval object that inspired AVISTA's moniker. The first contribution in this section is Barnes's farewell essay on Villard, and then George Brooks pursues a number of significant ideas

related to the manuscript that point the way forward from Barnes's magisterial facsimile and critical analysis. Brooks, responding directly to Barnes's earlier codification of the ten reasons Villard could not have been an architect or master mason, presents five arguments to rescue Villard from the conclusion that he may have been little more than "a clerk with a flair for drawing" as Branner had quipped, but was rather trained in the neighboring field of carpentry. Brooks also adds an addendum responding to a recent analysis that attempts to resurrect Villard's reputation as an architect. William Sayers follows with a careful linguistic consideration of the terminology that Villard used in relation to his drawing of a trebuchet, correcting a long-standing error in interpretation that has left many with the impression that his siege weapon somehow launched arrows. This study further bolsters Villard's reputation as someone who, although likely not a military engineer himself, nevertheless understood technical matters. Maile Hutterer looks anew at Villard's drawing conventions, deepening the discussion of Barnes and others on how he saw and rendered different kinds of topics in the context of Gothic conventions, and attempts to unravel the motivations for his blending of multiple representational strategies. Ellen Shortell revisits her earlier work on the evidence for Villard having been at Saint Quentin, and mines new insights on the working methods of masons in Villard's time. This section concludes with Erik Gustafson's discussion of Villard's intellectual community and what the Portfolio can tell us about the reception of Gothic architecture within a scholastic framework. Together, the essays of this section offer a variety of directions for future studies of the ever-enigmatic BnF MS fr 19093.

Part II focuses on medieval technology. John James shares insights developed over fifty years spent climbing in and around Gothic churches in search of the lithic evidence that might bring to life the individual builders and carvers, the masons and the template-makers, who constructed them. James concludes from the reality of working with medieval mortar, the lack of consistent measure, and the universal language of geometry, the limits and possibilities of what we can know about them. Nancy Wu revisits her examination of the architectural tools depicted on the tomb slab of Hugues Libergier, the 13th-century builder associated with the building of the Abbey Church of Saint-Nicaise in Reims, and wrestles with the nature of representational versus emblematic depictions as signifiers of profession and status. Kathleen Wilson Ruffo explores another medium for technological depiction, the illuminated manuscript, specifically that of the anonymous 14th-century Remede Master, who employed clockwork mechanisms along with *Wheel of Fortune* motifs in novel ways as metaphorical signifiers while also attending to contemporaneous developments in the mechanics of timekeeping. Following the path from

depictions to constructions, Amy Gillette surveys the evidence and explores the liturgical functions of "angel-machines," which were constructed in ecclesiastical settings with increasing frequency in the 14th century. Steven Walton closes out the section with a thorough linguistic and semiotic analysis of the terms used to refer to gears from their earliest appearances in Vitruvius, through the medieval millennium, to the era of printing, while reflecting upon their various meanings as signifiers of the machine age and wondering why it took so long for a standard term to emerge. Collectively, we are again reminded of the necessity of multidisciplinary approaches—tomb slab, manuscript illumination, altarpiece, marginalia, artifacts, linguistics—for the study of mechanical devices in an era before their builders took up the habit of writing about them.

In Part III the focus moves to Gothic monuments. In keeping with the history of AVISTA and its publications, these essays largely focus on ecclesiastical architecture, with the exception of Maggie Williams, whose article considers monumental Irish crosses. The seven contributions in this section are arranged chronologically. Williams's essay, which begins this section, considers the multivalent iconographies present on the *Cross of the Scriptures* in central Ireland, newly updating her previous work on this topic with a discussion of polychromy. Williams's interest in art as propaganda is echoed by Mickey Abel, who examines the political implications of the 11th-century rebuilding projects of Maillezais Abbey on the west coast of France. Abel's attention to the abbey's infrastructure simultaneously underscores the connections between various crafts, just as Villard's Portfolio moves between religious architecture and military machines. Sarah Thompson tackles the theme of building-in-time in her examination of Notre-Dame d'-Étampes in the 13th century, considering how the institution's role changed with its declining fortunes following its heyday in the mid-12th century. Michael T. Davis extends this consideration of the design process, reconciling the approaches of Carl Barnes and William Clark in his study of the choir of the Cathedral of Clermont-Ferrand. In this way, design can be understood as a process that depends both on human agency and temporal duration. The subsequent two essays move to Spain, considering how architectural forms emerge and spread. Richard Sundt focuses on the use of the full-star vault, or *palmier*, in the design of the Jacobin church in Toulouse. Robert Bork's study looks at cathedrals with five aisles of staggered heights, exploring ideas of categorization within the medieval architectural and modern historiographical contexts. The final essay of the volume, by Alice Isabella Sullivan, moves to eastern Europe—an homage to Villard's trip to Hungry. Returning to issues of patronage and propaganda, Sullivan demonstrates the connections between western and eastern architectural practices, reminding us of the interconnectedness of the medieval world.

The eclecticism of Villard de Honnecourt's Portfolio has always been part of its wonder. In establishing an explicitly interdisciplinary society, Jean Gimpel leveraged Villard's work in part for the breadth of the interests represented within its pages. With this volume, we aspire to honor Villard's expansive curiosity, which is similarly reflected in the richness of the work of Carl Barnes and William Clark, founding members of AVISTA to whom this volume of studies is dedicated. Learning from the past, we look toward future studies that continue the exploration into the many worlds of scholarship that have been inspired by Villard de Honnecourt—whoever he was—through the miraculous survival of this unique manuscript.

AVISTA and Its Publications: A Brief History

Ellen M. Shortell

This volume marks the beginning of a new partnership between Brill and AVISTA, the Association Villard de Honnecourt for the Interdisciplinary Study of Medieval Technology, Science, and Art, as we continue the AVISTA Studies series initiated in 2001.[1] As we open this new chapter in AVISTA's history, we look back on nearly four decades of publication by offering essays from past issues of *AVISTA Forum Journal* alongside new contributions that look toward the future. AVISTA's first publication, *AVISTA Forum* (1986–2000), later *AVISTA Forum Journal* (*AFJ*) (2001–13), appeared in 35 issues over the course of its 27 years. *AFJ* evolved in that time from a 15-page photocopied newsletter to a professionally printed peer-reviewed journal ten times that size.[2] The original *AVISTA Forum* was meant to facilitate the interdisciplinary collaboration at the heart of the organization's mission through an informal exchange of ideas. Its format changed over time as AVISTA grew, adjusting to shifts in disciplinary boundaries and academic publishing standards.[3] By 2013, it became clear that *AFJ*'s self-publishing model was no longer tenable, and it was decided to cease publication. By that time, some of *AFJ*'s initial function as a platform for discussion had been superseded by internet forums and social media, while much of its more formal scholarly production had moved to this series.[4] The journal had a fairly small circulation. With this volume, the editors hope to bring some of its highlights to a wider audience.

It is fitting that we pay homage with this collection to two of AVISTA's founding members who played important roles in framing its publication strategies. Art historians Carl F. Barnes, Jr., and William W. Clark, who were both protégés

1 The series was initially published by Ashgate Publishing until the press was sold to Routledge, Taylor & Francis Group in 2015. AVISTA is deeply grateful to former Ashgate editor John Smedley for his 15 years of support, expertise, and friendship and thanks Michael Greenwood for his efforts to continue the series with the successor company.

2 Van Arsdall, "Editor's Note" and Walton, "Twenty Years of AVISTA Publications."

3 I am especially grateful to Steve Walton for his extensive comments on an earlier draft of this essay. Thanks are due as well to Michael T. Davis, Carol Neuman de Vegvar, and Nancy Y. Wu for the reflections on AVISTA's history that they have shared with me.

4 Olson, "President's Letter" and Bowers, "A Note from the Editor." Relevant announcements, news, calls for papers, and abstracts of sponsored conference sessions subsequently appeared on AVISTA's official web page, http://www.avista.org. and more recently on the organization's Facebook page.

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of Robert Branner at Columbia University in the 1960s, served as AVISTA's first vice president and treasurer, respectively. They helped to launch the original *AVISTA Forum* and remained active in the organization throughout their academic careers. Much of Barnes's scholarship was dedicated to the study of the collection of drawings he referred to as the "portfolio" of Villard de Honnecourt (Paris, BnF MS fr 19093), which inspired the formation of AVISTA and remains at the heart of the organization's work. Barnes maintained and updated an exhaustive annotated bibliography on the Portfolio, a study that led him to conclude that Villard was not an architect.[5] He eventually produced a full-scale color facsimile under the auspices of AVISTA.[6] Many of the essays published here are indebted to his studies of the drawings and their historiography.

William W. Clark is best known for his work on French Gothic architecture, particularly the Abbey Church of Saint-Denis.[7] Bill was often the organizer, or at least the instigator and advisor, of sessions on a variety of topics at the International Congress on Medieval Studies at Western Michigan University in Kalamazoo. As AVISTA developed, these sessions became a major focus of the association's activity and helped to generate ideas that found their way to the pages of *AFJ* and, later, the AVISTA series. Bill Clark took an active part in conversations between AVISTA's leadership and Ashgate Press to establish the AVISTA Studies series of multi-authored, thematic volumes. He also assured the series a robust beginning with his mentorship of the next generation of scholars, not only actively encouraging each of us to develop our own ideas, but also introducing us to one another and urging us to collaborate. While his scholarship on Gothic architecture will surely endure, his mentorship of younger colleagues may ultimately be his greatest contribution to the field. Many American scholars in medieval architecture and monumental arts readily acknowledge a profound debt to his generous and enthusiastic guidance.[8] As we look to a future fueled by the energy and ideas of a new generation

5 Barnes, *Villard de Honnecourt: The Artist and His Drawings*. The bibliography was later published on the web with continuing updates by Barnes until his death in 2013, after which it migrated to the AVISTA website where AVISTA members continue to maintain it. See http://www.avista.org/, accessed 20 January 2021. For his arguments on Villard's knowledge of building, see Barnes, "Le 'problème' Villard de Honnecourt." Jean Wirth, *Villard de Honnecourt: Architecte du XIIIe siècle*, 10, describes the reception of Barnes's conclusions as "accepted dogma."

6 Barnes, *Portfolio*.

7 His publications include "Suger's Church at Saint-Denis"; "'The Recollection of the Past Is the Promise of the Future'"; and Radding and Clark, *Medieval Architecture, Medieval Learning*; "Suger's Church at Saint-Denis."

8 AVISTA sponsored a symposium in honor of William W. Clark at the CUNY Graduate Center in New York on Tuesday, 10 February 2014.

of scholars, we reflect with gratitude on the work of our predecessors and mentors.

1 AVISTA's Beginnings

AVISTA came into being through the inspiration of Jean Gimpel (1918–96), a self-taught historian of technology. Gimpel had become fascinated by the 13th-century technical, figural, and architectural drawings of Villard de Honnecourt, whose name is known from a single, brief text in the manuscript that now bears his name, but whose biography and profession remain a matter of speculation.[9] Gimpel would go on to add his own perspective to those of the many researchers who had studied the drawings and the person, or persons, behind them since the 1840s.[10] To inform his research, he sought out colleagues with a range of expertise, and in November of 1983, a small group of French scholars joined Gimpel in the town of Honnecourt-sur-Escaut in northwestern France, Villard's presumed birthplace. They formed the Association Villard de Honnecourt, and embarked on a collaborative, interdisciplinary study of medieval art and technology in general, and of Villard's drawings in particular.[11] Founding members who joined Gimpel included art historian Alain Erlande-Brandenburg (1937–2020), historian Régine Pernoud (1909–98), and architect Roland Bechmann (1919–2017).[12] Together they would produce a small-scale facsimile of the Villard manuscript, *Carnet de Villard de Honnecourt*, with commentary reflecting their several disciplinary perspectives.[13] This first product of shared expertise embodied the ideals of collaborative scholarship that also motivated the founders of AVISTA in the United States.

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9 Some French scholars continue in the belief held since the 19th century that Villard was an architect, while most scholars have come to agree with Carl Barnes and Robert Branner that the drawings show that he was not. See Barnes, *Portfolio*, and Wirth, *Architecte du XIIIe siècle.*

10 Early commentary includes Jules Quicherat, "Notice sur l'album de Villard de Honnecourt"; Jean-Baptiste-Antoine Lassus, *Album de Villard de Honnecourt*; and Eugène-Emmanuel Viollet-le-Duc, "Première Apparition de Villard de Honnecourt." For additional publications, see Barnes, *Villard de Honnecourt: The Artist and His Drawings*.

11 Marie-Thérèse Zenner, Introduction, *Villard's Legacy*, p. XVII and n. 1; and Zenner, "Timing Is Everything," 7–9.

12 The French society continues today under the aegis of the national Comité des travaux historiques et scientifiques, based at the École des Chartes, but with limited activity. It is based in Honnecourt, and has an internet presence at http://cths.fr/an/societe.php?id=1779, accessed 5 January 2021.

13 Alain Erland-Brandenburg et al., *Carnet de Villard de Honnecourt*.

A year after the French group met in Honnecourt, Charles Stegeman, then Professor of Fine Arts at Haverford College, became interested in Villard and learned of Gimpel's work. A chance meeting in Honnecourt in 1984 brought Stegeman and his wife, architectural historian Marie-Thérèse Zenner, face-to-face with Gimpel; the encounter led to the foundation of AVISTA as an affiliated organization in the United States the following year.[14] To lay the groundwork, Gimpel encouraged Stegeman to consult with Lynn T. White, Jr., a founding member of the Society for the History of Technology, and with Carl Barnes, who had already devoted a great deal of study to Villard's drawings, and had translated Gimpel's 1958 book, *Les bâtisseurs des cathédrales*, into English.[15] Charles Stegeman became AVISTA's first president, with Carl Barnes serving as vice president, Marie-Thérèse Zenner as secretary, and Bill Clark as treasurer; Lynn White served on the board of directors, which brought together representatives of several disciplines. In addition to White, the first directors included historians of science and technology Pamela O. Long and George Salibas; historians Marjorie Boyer, David S. Landes, and Charles M. Radding; and historians of art and architecture Jean Bony, François Bucher, Dale Kinney, Yoshio Kusaba, and Vivian Paul.[16]

In 1987, a second affiliated society, The Society for the History of Medieval Technology and Science (SHMTS) had its first meeting in Britain, under the leadership of Alistair Crombie.[17] The first lecture, "Medieval Technology for Third-World Countries: A Talk with Models," was presented by Jean Gimpel himself, highlighting his work adapting Villard's drawings of simple medieval machines for contemporary use.[18] As its name suggests, SHMTS focuses on medieval technology and science, but not on art, while AVISTA's membership from the beginning has included many art and architectural historians as well as historians of culture and technology with a particular interest in buildings and machines. Villard's drawings, of course, have particular relevance for the history of architecture; and although it is no longer widely accepted, the idea that Villard was an architect, first proposed in the 19th century, has had a long life in the field.[19] From these origins, it should not be surprising that AVISTA

14 Zenner in *Villard's Legacy*, p. XVII and n. 1; and eadem "Timing Is Everything," 7–8.

15 Gimpel, *Les bâtisseurs des cathédrales*. See also Zenner, "Timing Is Everything," 8.

16 *AFJ* 1, no. 1 (1986): 2.

17 For information on SHMTS, see https://shmts.org/Home.html, accessed 20 January 2021.

18 Stegeman, "Jean Gimpel and the Legacy of Medieval Technology," 29–34. Gimpel's lecture is described in the online Proceedings 1 at https://shmts.org/1.html, accessed 20 January 2021.

19 Barnes, *Villard de Honnecourt: The Artist and His Drawings*.

has come to be associated especially, although certainly not exclusively, with studies of medieval architecture.

2 Opening a Dialogue: *AVISTA Forum* and Kalamazoo

In the United States, AVISTA's founders, eager to gather a group of researchers from a broad range of disciplines, made plans to reach out to other like-minded medievalists. In 1985, they held a reception at the annual International Congress on Medieval Studies at the University of Western Michigan in Kalamazoo. In 1986, AVISTA sponsored two sessions at the Congress on "The Technical Revolution of the Early Second Millennium A.D. and its Impact on Our Society," with papers on architecture and technology by Chantal Hardy, Carl Barnes, Robert Mark, and George Ovitt. *AVISTA Forum* made its appearance the same year. Free copies of the first issue, which appeared in the fall of 1986, were sent to some 2800 medievalists in the United States and abroad in hopes of attracting new members.[20]

AVISTA Forum's first editor was Pamela O. Long, a historian of medieval science and technology. In her opening statement as editor, entitled "Beginning an Interdisciplinary Dialogue," Long acknowledged the difficulty of achieving robust, productive discussion among specialists in different fields. At a time when increasing specialization within disciplines made knowledge less accessible to nonspecialists, crossing disciplinary boundaries could present its own difficulties. The discomfort of communicating outside one's own area of expertise, the reluctance to present work in progress with unresolved questions, and the pressures of busy schedules and institutional expectations, all tend to discourage the kind of discussion AVISTA aimed for. She encouraged members of AVISTA to nonetheless undertake such a dialogue by thinking of themselves as specialists in specific disciplines and interested nonspecialists in others.[21] Approaching the matter with a combination of authority and open-minded questioning, they might begin "filling the spaces between" disciplines and realize "the potential to create a cultural history of far greater depth and unity" than specialized disciplinary studies alone could bring about.

Carl Barnes's introduction to the new organization, "Why AVISTA?" followed Long's statement and further articulated the goals of the Association, stating that "AVISTA's purpose is to bring together humanists and scientists in all disciplines, to have them share information and theories informally, to have them

20 Stegeman, "Why Join AVISTA Now?"

21 Long, "Beginning an Interdisciplinary Dialogue."

help one another broaden their individual perspectives, [and] to permit them to be a common resource pool …"[22] Barnes expressed some regret that other societies that had started with similar goals of informal, friendly exchange had, over time, become more formal and specialized.[23] In particular, he cited the International Center of Medieval Art (ICMA), which had promised in 1963 that its new publication, *Gesta,* "would not take the place of professional journals," but would provide a forum to share research in progress, new discoveries, and news of the field. Less than five years later, the ICMA reconsidered the role of its journal, as the quantity and quality of submissions had far exceeded initial expectations.[24] By 1987, *Gesta* had become the preeminent, peer-reviewed journal for medieval art history that it is today.

Gesta and *AVISTA Forum* were just two among thousands of new journals initiated by scholarly societies in the second half of the 20th century. Characteristically, both were started by fairly small groups of scholars who saw a need that existing periodicals did not meet.[25] While AVISTA strove to create networks across disciplines, however, the ICMA was founded to serve the needs of a growing subdiscipline, one whose boundaries it has continued to define and redefine.[26] The ICMA's shift to a more formal mode of publication responded to both an increasing interest in the field of medieval art and changing standards for academic tenure.

The evolution of *Gesta* and the ICMA were quite familiar to Carl Barnes, who served as ICMA President from 1978 to 1981. François Bucher, another AVISTA founder, had been the first editor of *Gesta*. But two decades after *Gesta*'s change in format, Barnes and the other founders of AVISTA remained firm in their belief that the best way to encourage conversations and foster new connections across disciplines was to free participants from the strictures of formal publication. The "forum" in *AVISTA Forum* was meant to describe the tenor of conversations it could facilitate, and the early issues of *AVISTA Forum* included sections designed to create dialogue. "Works in Progress," would allow contributors to share their work at an early stage, and to elicit comments, suggestions for resources, and reports of related studies to enrich their work. News editors Carol Neuman de Vegvar and Heather Williams brought a wealth of

22 Barnes, "Why AVISTA?"

23 Olson, "President's Letter," also summarized some of this early history in the final issue of the journal.

24 Bucher, "Editor's Note."

25 McCabe, "The Growth and Number of Journals," attempts to quantify the production of new journals, and characterizes the modern process as "self-organizing and balanced," with a fairly steady rate of growth over time. My thanks to Steve Walton for this reference.

26 See http://www.medievalart.org.

information to connect readers to recently published papers, upcoming conferences, grant opportunities, and exhibitions. These were invaluable resources for specialists as well as those interested in reaching across disciplines, and, equally importantly, for students.

Reviews of articles, rather than books, were solicited in order to bring important new work to the reader's attention and to facilitate discussion of the most current ideas. Article reviews in early issues of *AVISTA Forum* spanned a broad range of topics, from medieval astronomy and mathematics, to magic, water control technology, and architecture. Reviews often generated responses that appeared in the next issue, including clarifications by the authors whose work had been reviewed, but also additional contributions to the subject from other readers. Unlike book reviews that originate as publishers' requests, the articles reviewed in the *Forum* reflected the reading choices of members and editors, and offered their authors the chance to reflect on the state of a particular question debated in the most recent research.[27]

Also included was a column of "Notes and Queries," a format modeled on the journal *Notes and Queries* established in 1849 by W.J. Thoms as "a medium for intercommunication" among literary, artistic, and historical specialists.[28] Now published by Oxford University Press, its main purpose "remains the asking and answering of readers' questions."[29] *AVISTA Forum* published queries, with the expectation that responses would follow in a subsequent issue.[30] The promise that the queries would be identified by number and the responses "matched by computer to each query," suggests that the editors hoped this column would engage more and more readers with subsequent issues. In fact, "Notes and Queries" usually generated two or three queries per issue, and their nature varied greatly in specificity. Among the first were Danish researcher Stephen Christensen's broad and open-ended request to share ideas with others working on "cultural transfers in the Mediterranean or in Central Europe," while Mary Carruthers, whose work on memory and rhetoric was in an early

27 Longer reviews of multiple articles included Lawrence Hoey, "New Studies on Canterbury Cathedral," and Michael T. Davis, "The Literal, the Symbolic, and Gothic Architecture."

28 The journal was originally subtitled *Medium of Inter-Communication for Literary Men, Artists, Antiquaries, Genealogists, etc.* Digitized versions of early issues are available through Internet Archive at https://archive.org/details/notesqueries01londuoft/page/n7/mode/2up (accessed 27 December 2021).

29 Oxford Press web page for *Notes and Queries*, https://academic.oup.com/nq/pages/About (accessed 27 December 2021).

30 Barnes, "Why AVISTA?"; Long, "Beginning an Interdisciplinary Dialogue."

stage, was looking quite specifically for instances of the use of the Latin word "torus" in medieval documents.[31]

Although the original periodical is still published by Oxford, the concept of "Notes and Queries" now seems quaint. However, it was prescient in offering a means to gather ideas on a given topic from multiple responders. Today, new technologies from listservs to social media fulfill the same functions that "Notes and Queries" was designed for, but reach a larger audience much more quickly. By 1993, in fact, digital technology had evolved to the point that AVISTA's President, Warren Sanderson, while still encouraging readers to send queries and responses, suggested that an electronic bulletin board might better fulfill the same purpose in the future.[32] While the feature continued, the topics turned to themes of general interest that lent themselves to extended discussion. By the time *AVISTA Forum* ceased publication, the organization had established both a website and a Facebook page, which provide a web presence, but are largely informational.[33] As with a printed journal, a significant online presence is difficult for a small organization to sustain without professional support, and informal discussions among colleagues more often spring organically among those connected through broader-based social media.

While "Notes and Queries" may have fostered limited, slow-moving discussions, livelier conversations were possible in person. An especially significant vehicle for interdisciplinary dialogue has been AVISTA's increasing sponsorship of conference sessions at the annual Congress on Medieval Studies at Western Michigan University in Kalamazoo, and, more recently and to a more limited extent, the International Medieval Congress at the University of Leeds.[34] Each Congress itself casts a wide net, offering papers in all fields within the chronological boundaries of the Middle Ages. Taking place at the end of the academic year, Kalamazoo also encourages a less formal atmosphere than professional conferences in individual disciplines and provides opportunities for engagement across fields. It is in many ways an ideal venue for AVISTA.

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31 Stephen Christensen in "Notes and Queries," *AVISTA Forum* 1, no. 1 (1986): 8; Mary Carruthers in "Notes and Queries," *AVISTA Forum* 2, no. 1 (Spring 1988): 3. Mary Carruthers's foundational and influential work, *The Book of Memory* (*A Study of Memory in Medieval Culture*) was published three years later in Cambridge Studies in Medieval Literature 10 (Cambridge: Cambridge University Press, 1990).

32 Warren Sanderson, "A Note from the President."

33 http://www.avista.org, accessed 18 February 2022.

34 The International Medieval Congress was established in 1994, and was inspired by the International Congress at Kalamazoo. See https://www.imc.leeds.ac.uk/, accessed 18 February 2022 and https://wmich.edu/medievalcongress, accessed 18 February 2022.

After its first session in 1986, AVISTA sponsored another in 1987 on "Iconography and Use of Wheels and Circles in the Middle Ages," followed in 1989 by two sessions on Villard's drawings and an exhibition of images from the Portfolio. By the mid-1990s AVISTA was organizing between three and five sessions each year, in some cases partnering with other, more specialized, organizations, including Medica, De Re Militari, the International Center of Medieval Art, the American Numismatics Society, and the Medieval Brewers' Guild. These partnerships helped to forge relationships that increased AVISTA's visibility and its capacity to reach across disciplinary boundaries. Some members of these groups also belonged to AVISTA, bringing their particular expertise to interdisciplinary discussions and maintaining awareness of activities and developments within their specialties. Congress sessions were announced in advance in the *Forum* with a call for papers, as well as in the Congress's general call. Abstracts of the papers were subsequently published in *AVISTA Forum*, creating records of in-person presentations and offering readers material for continued discussion.

3 *AVISTA Forum Journal*: Yielding to Peer Review Pressure

In the initial issue of *AVISTA Forum*, Carl Barnes bemoaned the lengthy and cumbersome process of publishing a paper in a scholarly journal like *Gesta*: "Now an editor and two readers have to approve each article submitted for publication, and delays in publication of submissions of two years are not uncommon."[35] In 1990, as president, he touted the fact that AVISTA still encouraged individual, even controversial, interpretations: but, at the same time, he reminded contributors of the need to provide evidence for their statements.[36] Four years later, members began to express support to include formally refereed articles, which would require authors to document their work and allow readers to evaluate their sources. At the general business meeting in 1994, Michael T. Davis, who followed Pamela Long as editor, proposed that *AVISTA Forum* move to an all-refereed format.[37] Academia and academic publishing had changed, and despite repeated pleas from the editor and the president, contributions to the *Forum* had dwindled; contributions to "Notes and Queries" and "Work in Progress" were few and far between and article reviews were

35 Barnes, "Why AVISTA?," 4.

36 Barnes, "At What Price Progress?"

37 Annual Business Meeting of AVISTA, *AVISTA Forum* 9, no. 1 (1995): 23.

offered by only a handful of members.[38] The *Forum* was also in competition with other new journals created by more specialized learned societies. Younger scholars who were joining AVISTA's ranks often looked to publish in more prestigious journals within their fields to fulfill the requirement for peer-reviewed publications for academic tenure. Many of the contributions that were submitted came from established scholars and from a small, core group of AVISTA members. A journal simply could not sustain itself under these circumstances. AVISTA needed to rethink the purpose and format of its publication.

While it is now commonplace, the peer-review process that Barnes complained of only became widely used for publication in the humanities in the decades after the Second World War. The process ideally aims to create collaborative agreement on scholarly standards within a given discipline, but also, by extension, offers a stamp of collegial approval to publications. Peer-reviewed publication became critical to hiring, promotion, and tenure decisions for many young academics. *AVISTA Forum* responded to this situation in part when it became the *AVISTA Forum Journal*. It should be noted, however, that submissions to the *Forum* had always been reviewed by expert readers, and for much of its existence, in addition to the editor-in-chief, there were separate area editors for science and technology, art and architecture, and for the "notes and queries" and "news, papers, and activities" sections. The difference was simply that there was not a clearly defined peer-review process, and so the *Forum* was not looked to as a peer-reviewed venue for professional publications. In reality, as recent studies have pointed out, the peer-review process was in flux at that time, and there was no single standard, particularly in the humanities.[39] There was never a surplus of submissions to *AVISTA Forum* that might have encouraged a discussion of a review process, and the editor could not truly anticipate what the next issues might hold. Davis hoped that by developing a regularly refereed publication, the journal would attract younger scholars who would be encouraged by the possibility of publishing peer-reviewed work quickly. The word "Journal" was added to the title, beginning with volume 11 in 2000, to underline this change.

The change to peer review did have a positive effect, but the difficulties of continually soliciting substantial contributions and of self-publishing continued. Anne van Arsdall, a specialist in medieval herbals, succeeded Michael Davis as editor in 2004. To assure more predictable and diverse content,

38 Michael T. Davis, "Is Anyone out There??" *AVISTA Forum* 6, no. 1 (Fall 1991/Spring 1992): 1.

39 There is a growing body of studies on the history and value of the peer-review process in different disciplines. Most relevant here are Sam Rose, "Peer Review in Art History," and Mario Biagioli, "From Book Censorship to Academic Peer Review," 11–45.

she reached out to colleagues in other organizations whose themes intersected with AVISTA's, identifying relevant conference sessions, and obtaining abstracts from many of them. The brief abstracts of the "Kalamazoo Roundup" and "Leeds Roundup" brought a wealth of new ideas and contributors to the journal's pages. Speakers at AVISTA sessions were also asked to expand on and document their papers for publication, providing readers with a more in-depth review of the conference proceedings. Barbara Bowers, the final editor of *AFJ*, continued this feature. However, editors continued to devote a tremendous amount of unpaid time to producing the publication. In the end, it simply became too difficult to sustain with a few volunteers. Meanwhile, AVISTA's leaders had begun to produce a series of multi-authored volumes on focused topics.

4 A New Focus: AVISTA Studies in the History of Medieval Technology, Science, and Art

AVISTA's sponsored sessions at Kalamazoo have frequently included multiple sessions on a single theme, sometimes from different disciplinary perspectives and at other times eliciting new research within a single discipline. In 1998, Bill Clark organized three of AVISTA's sessions entitled "Ad Quadratum," which focused on the role of geometry in the design of medieval buildings. Seven short papers on architectural design practices from the 9th through 13th centuries were followed by a workshop in which participants set out the plan of an idealized Gothic cathedral, using stakes and ropes to mark the placement of supports on a playing field.[40] The workshop was notable enough to be listed among the highlights of the conference by Paul Szarmach, Director of the Medieval Institute at Western Michigan University, in his welcome to congress attendees.[41]

The sessions engendered some enthusiasm for expanding the material presented in the talks into a volume of essays organized around the theme of geometry in medieval architecture. Marie-Thérèse Zenner and Warren Sanderson, then President of AVISTA, began discussions with John Smedley of Ashgate Press, who spoke to the membership assembled at the next year's business meeting. Sanderson asked architectural historian Nancy Wu to chair a new publications committee, and to edit the first volume. Details of a contract

40 33rd International Congress on Medieval Studies, program, Western Michigan University, 7–10 May 1998, 93, 109, and 123.

41 33rd International Congress program, 111.

for a series of volumes were finalized by Nancy Wu and Sanderson's successor as President, Lynn Courtenay, in 2000. *Ad Quadratum: The Practical Application of Geometry in Medieval Architecture* was published in 2002.[42]

It was expected that subsequent volumes would be published regularly, with many of the topics deriving from AVISTA's sessions at Kalamazoo. Thirteen volumes of essays were published between 2002 and 2020 with Nancy Wu, Ellen Shortell, Carol Neuman de Vegvar, and Jennifer Feltman as successive chairs of the publications committee, and others are now in progress. Several volumes approached specific materials or topics from varied disciplinary perspectives. *De Re Metallica: The Uses of Metal in the Middle Ages*, edited by Robert Bork with the assistance of Carol Neuman de Vegvar, Ellen Shortell, and Steven Walton, looked at medieval metallurgy, precious metal objects, utilitarian objects, and the use of metal in architecture.[43] Similarly centered on a single material was *Working with Limestone: The Science, Technology, and Art of Medieval Limestone Monuments*, edited by Vibeke Olson.[44] The volume included reports on the use of the modern scientific technique of neutron activation to pinpoint the sources of limestone used in medieval buildings, as well as observations on and documentation of medieval methods of quarrying, transporting, and carving limestone. Two volumes involved collaborations with specialists in medieval medicine and science who were not AVISTA members. *The Medieval Hospital and Medical Practice*, edited by Barbara Bowers, was the result of collaboration with Medica: The Society for the Study of Healing in the Middle Ages.[45] *Visualizing Medieval Medicine and Natural History*, published in 2006, was coedited by specialists in art history, history of science, and history of medicine Jean Givens, Karen Reeds, and Alain Touwaide, respectively.[46] Recent conference sessions and publications show the organization's engagement with models of history and culture that reflect reassessments of past practice. For example, *The Long Lives of Medieval Art and Architecture*, edited by Jennifer Feltman and Sarah Thompson, includes essays that examine the historiography and changing cultural contexts of works of art, while the essays in *Fifty Years of* Medieval Technology and Social Change, edited by Steven A. Walton cast an eye over the history of the field of medieval technology.[47]

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42 Clark and Wu, Preface, *Ad Quadratum*, p. XIII.

43 Bork et al., *De Re Metallica*.

44 Olson, *Working with Limestone*.

45 Bowers, *The Medieval Hospital*.

46 Givens, Reeds, and Touwaide, *Visualizing Medieval Medicine and Natural History*.

47 Walton, *Fifty Years of* Medieval Technology and Social Change.

Since the series was established, the topics of session proposals at Kalamazoo and Leeds have often been discussed with an eye to their appropriateness as a topic for the series. Even while the series and *AFJ* existed side by side, papers presented at Kalamazoo in AVISTA sessions were now more likely to appear in a series volume. *AFJ*'s publication of extended conference abstracts provided a preview of some of the volumes' contents, but also continued to be a venue for researchers to publish articles on their recent work. This division of activity was no doubt a factor in the demise of *AFJ*; however, the time was ripe to move to professional publication, and the series has flourished in a way that the journal could not. The original concept for *AVISTA Forum* was meant to encourage spontaneous discussion, but this meant that individual issues of the journal often covered a wide variety of topics in brief, without evident connections among them. By focusing on a specific subject with each volume, the series offers the possibility of bringing different perspectives to bear on historical questions in a more thorough and coherent way. The relationship to conference sessions also allows the contributors to begin thinking together about their work as part of a larger project from the beginning.

5 Changing Perspectives on Medieval Interdisciplinarity

Interdisciplinarity, cross-disciplinarity, and post-disciplinarity have become so common in contemporary scholarship that we might forget how forward-looking AVISTA's original focus was. As Pamela Long anticipated in the first issue of *AVISTA Forum*, however, productive interdisciplinary discourse was an ambitious goal. From the beginning, conference sessions as well as the journal offered material on medieval art, technology, and, to a lesser extent, science, but individual contributions to *AFJ* often stood alone rather than engendering an extended interdisciplinary dialogue. Simply by making diverse topics available in one place to specialists and nonspecialists, however, *AVISTA Forum* made a valuable contribution to the sharing of ideas. The increasing specificity of conference sessions over time, along with the production of themed volumes, has helped to encourage more conversation as contributors engage with one another's work.

AVISTA studies have revealed the complementarity and interdependence of technology and art and have also applied modern scientific techniques to the study of objects and materials. With the exception of medicine, less attention has been given to medieval science; the more theoretical modes of thinking involved in natural philosophy in particular have largely been absent from the discussion. As Michael Davis pointed out in a 1995 *AVISTA Forum* article,

natural philosophy has traditionally been seen as the separate realm of medieval scholars and clerics, distinct from the hands-on processes of working with materials, engineering, making, and building that AVISTA studies have tended to focus on.[48] When AVISTA publications have engaged with natural philosophy, it has more often been through the lens of architecture, image-making, or even literature, as the organization has not attracted a cohort of historians of science as members.[49] In AVISTA's early years, too, the definition of science was taken more broadly. AVISTA's idea of what constitutes interdisciplinarity has also changed over time.

AVISTA's founders began with Jean Gimpel's concept of an enterprise that would examine the interactions of technological discovery, scientific inquiry, and the creation of art in the Middle Ages. In the organization's name, the order of the terms of study—"Medieval Technology, Science, and Art" was sufficiently important that the creation of a good acronym required some contortions. The S, T, and A of "AVISTA" stand for **S**tudy, **T**echnology, and **A**rt, and not, as one might expect, Science, Technology, and Art, so that "Technology" could precede "Science." This reflected Gimpel's belief that technology preceded science, and science, art, in the development of civilization. In the history of science, the technological developments of the Middle Ages are seen as predecessors to the experimental science of the modern era. In more general terms, however, Gimpel's model implies a hierarchy of thought and a historical progression that scholars in the humanities have since rejected as a false construct.[50]

AVISTA's interdisciplinarity was inspired by a single manuscript, the Portfolio of Villard de Honnecourt. Its drawings of machines, buildings, and figures as well as diagrams of geometric operations and construction details seem to reflect the endeavors of different medieval professions, and so have inspired questions from a variety of disciplinary perspectives in addition to the idea of interdisciplinary collaboration itself. AVISTA has always been grounded to

48 Davis, "Science, Technology, and Gothic Architecture."

49 Examples include Davis, "Science, Technology, and Gothic Architecture;" Colette, "Some Aesthetic Implications;" and Givens, Reeds, and Touwaide, *Visualizing Medieval Medicine and Natural History.*

50 The bibliography on the subject is now extensive. Fundamental works include Roland Barthes, "The Discourse of History" (1968), in idem, *The Rustle of Language*, trans. Richard Howard (Berkeley: University of California Press, 1989), 127–41; Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage Books, 1973); Hayden White, *The Content of the Form: Narrative Discourse and Historical Representation* (Baltimore: Johns Hopkins University Press, 1987); and Michel de Certeau, *L'Ecriture d'histoire* (Paris: Editions Gallimard, 1975).

some extent in Villard's legacy. Given Villard's importance to AVISTA, it may seem ironic at first that Carl Barnes's work led to widespread rejection of the idea that Villard was an architect or builder. Barnes's arguments, however, are symptomatic of the questioning of previously accepted ideas that invigorated late 20th-century scholarship. Our continued ignorance of Villard's life or profession may be a source of frustration for some, but it is an important catalyst for deeper questioning. At the time of AVISTA's founding, the assumptions underlying the study of historical events and objects in general were undergoing similar scrutiny.

The 1990s saw a reexamination of the humanities in general and the field of medieval studies in particular, as many scholars called for critical perspectives and more interdisciplinary studies. This meant not only expanding the types of objects and texts appropriate to a given discipline, but also examining the ideological underpinnings of the field. In a 1994 essay on the state of scholarship in medieval French literature, R. Howard Bloch reflected this trend, advocating truly interdisciplinary work that acknowledges the premises of the field and the perspectives of different observers, reaches across disciplines as well as national and language boundaries, and engages with scholars outside medieval studies, especially modernists, to bring to light the historical threads that stretch back across time from the present.[51] A parallel process was underway in the field of the history of science, which, as Paula Findlen explained, had always worked between the "two cultures" of humanities and sciences.[52] Findlen also argued for the application of new historical methodologies to bridge the space between science and the humanities, and to reconsider the grand narratives constructed by an earlier generation.[53]

The field of art history grappled with a variety of critical theories in the 1990s. Historians of medieval architecture, who have always made up a large proportion of AVISTA's members, began to ask questions that went beyond "who and when," beyond classifying capital types and base molding profiles on the one hand, and generalizations about light and space on the other. However, in 1994, Michael Camille, a leading voice for the use of critical theory in art history, accused medieval architectural historians of being afraid of interdisciplinarity, using measuring rods as a kind of security blanket, and clinging to positivist theories and modernist paradigms.[54] Michael Davis, editor of *AFJ*

51 R. Howard Bloch, "Old French Literature and the New Medievalism," 165 and 171–76.

52 The growing gulf between humanities and sciences was described by C.P. Snow, *The Two Cultures and the Scientific Revolution*.

53 Findlen, "The Two Cultures?".

54 Camille, "Art History in the Past and Future of Medieval Studies," 371.

at the time, weighed this criticism of the field in a 1999 article that appeared in the *Journal of the Society of Architectural Historians*, "'Sic et Non: Recent Trends in the Study of Gothic Ecclesiastical Architecture."[55] Davis cited several studies in which new critical approaches had, in fact, been fruitfully applied to architectural studies, but also supported the kinds of knowledge gained from the more traditional, close physical study of buildings. Whatever questions one might ask about medieval buildings, the physical object itself remains an essential element in understanding not only how and when a building was created, but also why it was conceived, how it was used and experienced, and why it has continued to interest us centuries later—the same kinds of questions Camille was asking of images.[56] As medieval art history has subsequently paid greater and greater attention to the physical qualities of objects, medieval ecclesiastical architecture offers a particularly fertile ground for studies that bring together theoretical and archaeological approaches that may once have seemed incompatible.

In the past decade, the histories of culture, art, and science have experienced another shift in perspective, dubbed the "material turn." Having rethought some of the misleading principles inherent in older disciplinary practices, we have returned to the objects and documents we study with the realization that the significance of many products of culture is inextricably linked to their objecthood and to the materials of which they are made, which can elicit a particularly meaningful, sometimes visceral experience.[57] Caroline Bynum demonstrated this point eloquently in regard to the practices of medieval Christianity, while art historians, particularly Herbert Kessler and Beate Frick, have examined the communication of meaning by material itself in works of medieval art.[58] Lorraine Daston and Katharine Park examined similar phenomena in nature as early as 2001, looking through the lens of late medieval and early modern natural philosophy.[59] AVISTA's long-term encouragement of the investigation of the objects and materials of medieval culture may not as a rule have articulated these characteristics of material, nor did

55 Davis, "'Sic et non.'"

56 The tension in the work of art history between the present experience of a physical object, and the need to understand it in historical terms has been addressed by a number of authors, including Caviness, "Reframing Medieval Art"; Dressler and Schleif, "Triangulating"; Marquardt, Introduction, *Medieval Art and Architecture after the Middle Ages*, 1–17.

57 Kumler and Lakey, "The Material Sense of Things in the Middle Ages."

58 Bynum, *Christian Materiality*; Kessler, "Vitreous Arts as Typology;" Frick, "Matter and Meaning."

59 Daston and Park, *Wonders and the Order of Nature*.

we systematically explore the philosophical implications of materiality before the present moment, but I would suggest that the idea has been inherent in AVISTA's work.

AVISTA's goal of establishing an interdisciplinary dialogue has led us to explore the subjects of our respective specializations from perspectives we would most likely not have considered on our own. The papers included in this volume offer a glimpse into the trajectory of the past four decades and represent different periods in the history of *AVISTA Forum Journal* as well as subsequent scholarship that looks to the future of our conversations.

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Special Volume in the Series

The Portfolio of Villard de Honnecourt: A New Critical Edition and Color Facsimile, Carl F. Barnes, Jr. (Farnham, 2009).

PART 1

Villard de Honnecourt: The Portfolio

CHAPTER 1

An Essay on Villard de Honnecourt and Cambrai Cathedral

Carl F. Barnes, Jr.†

Essay, n., (a) a short literary composition on a single subject, usually presenting the personal view of the author.[1,2]

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FIGURE 1.1
Portfolio of Villard de Honnecourt, fol. 22r detail: Standing Male Nude, *c.*1220/40 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

1 This article is a *verbatim* reprint of Carl F. Barnes, Jr. "An Essay on Villard de Honnecourt and the Cathedral of Cambrai." AVISTA Forum Journal vol. 17 1–2 (2007): 21–26. Reprinted with permission.

2 This essay is based on a portion of a paper delivered 10 May 2007 at the 42nd International Congress on Medieval Studies at Western Michigan University, Kalamazoo, Michigan.

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In 1849 Jules Quicherat, one of the founders of French medieval archaeology, was the first writer to dub Villard de Honnecourt an architect.[3] That appellation has stuck for more than a century and a half, during which period it became lavishly embellished. Two examples will suffice to prove the point: in 1876 Adolphe Lecocq called Villard "one of the immortals of 13th-century architecture"[4] and as recently as 1986 Jean Gimpel repeated the claim,[5] first made in 1859 by Prosper Mérimée,[6] that Villard was a "genius inventor, a kind of French Leonardo da Vinci." If any undocumented claim has become permanently embedded in art historical literature, it is that Villard de Honnecourt was an architect.

Few publicly challenged this assumption until the last quarter of the 20th century. I was one of the first to do so in a paper read in 1977 at a conference of The Society of Architectural Historians in Los Angeles. That presentation was titled "Villard de Honnecourt: Architect or Dilettante?"[7] I later expanded that paper into an essay, "Le 'Problème' Villard de Honnecourt," published in 1989 in *Les batisseurs des cathédrales gothiques*.[8] Since then a number of scholars have proposed that Villard de Honnecourt was not—nor could he have been—an architect. One of the earliest was Peter Kidson, who wrote: "anyone who wishes to insist that Villard really did know what every genuine medieval architect knew certainly has a lot of special pleading on his hands."[9] Rejection of the "Villard-as-architect" claim has come from the highest level of French art historical officialdom: Alain Erlande-Brandenburg wrote in 1995 that Villard de Honnecourt was not an architect and that "interpretations that he was one only serve to obscure the true man."[10] Several British writers have more recently been very blunt in their analysis of the "Villard as-architect" thesis: he

3 Jules Quicherat, "Notice sur l'album de Villard de Honnecourt, architecte du XIIIe siècle." *Revue archéologique* 6 (1849): 65–80, 211–26 and pls. 116–18.

4 Adolphe Lecocq. "La Cathédrale de Chartres et ses maîtres-de-l'oeuvre," *Mémoires de la Société archéologique d'Eure-et-Loire* 6 (1876): 396–479.

5 Jean Gimpel, "Villard de Honnecourt, architecte-ingénieur," in *Carnet de Villard de Honnecourt* (Paris, 1986), 27–38.

6 Prosper Mérimée, "Album de Villard de Honnecourt." *Moniteur universal* (20 December 1859) (reprinted as *Études sur les arts du moyen age* [Paris, 1967], 229–70), 232.

7 At the conclusion of that presentation Jean Bony said to me, "You're right, of course. But what was he?".

8 Carl F. Barnes, Jr., "Le 'problème' Villard de Honnecourt," in *Les bâtisseurs des cathédrales gothiques* (Strasbourg, 1989), 209–23.

9 Peter Kidson, "Review of François Bucher, *Architector: The Lodge Books and Sketchbooks of Medieval Architects*, *Journal of the Society of Architectural Historians*, 40, no. 4 (1981): 329–31.

10 Alain Erlande-Brandenburg, *Cathedrals and Castles: Building in the Middle Ages* (New York, 1995), 82.

was a man "who was incapable of accurately recording an architectural detail even when it was in front of his eyes"[11] and "Villard's renderings of the eastern part of Reims Cathedral are not merely crude but riddled with crass mistakes showing that he lacked such basic architectural skills as the ability to correlate cross sections and elevations."[12] Some more recent general books on medieval art now note that it may no longer be assumed as a knee-jerk reaction that Villard was an architect, for example, Marilyn Stokstad's *Medieval Art*.[13]

If Villard de Honnecourt was not an architect, what was he? I have several times proposed that his drawing technique suggests he may have been trained as a metalworker, one familiar with niello.[14] Yet even if this supposition is correct, it does not prove that goldsmithing was his profession, just as his interest in architecture does not prove him to have been an architect. In restudying Villard's drawings and rereading the literature on Villard in preparation for publishing with AVISTA's partner Ashgate Publishing Ltd. a new critical edition of his portfolio with the original leaves reproduced at 1:1 size and in color,[15] I realized there are a number of circumstantial clues in the portfolio that may indicate why he made certain of the drawings and that might also explain part of his travels.

The great variety of subjects in Villard's drawings, leaving aside the later drawings added to the portfolio, have puzzled scholars as to their purpose, the sheer mishmash being overwhelming. A key to making sense of it all is to realize that Villard made his drawings at different times and apparently for different purposes. Some he seems to have made simply for himself. They were visual recordings of things he found novel and interesting, for example, his rendering of a nude antique statue on fol. 22r (Figure 1.1). If Villard was a metalworker, his drawing of a hand warmer and detailed explanation on fol. 9r of how it worked could have been of some practical value to him; although if he knew how to create the object, one might well ask, "Why did he have to explain the process to himself?" It is difficult to imagine any practical or professional use for his drawings of insects and other small animals on fol. 7v.

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11 Nicola Coldstream, *Medieval Architecture* (Oxford, 2002), 80–81.

12 Christopher Wilson, *The Gothic Cathedral: The Architecture of the Great Church, 1130–1530* (London, 1990), 141.

13 Marilyn Stokstad, *Medieval Art*, 2nd ed. (Boulder, 2004), 283.

14 Carl F. Barnes, Jr., "The Drapery-Rendering Technique of Villard de Honnecourt," *Gesta* 20, no. 1 (1981): 199–206; idem "Bibliographic Terminology in the Portfolio of Villard de Honnecourt," *Manuscripta* 31 (1987): 71–76.

15 Carl F. Barnes, Jr., *The Portfolio of Villard de Honnecourt* (*Paris, Bibliothèque Nationale de France, MS Fr 19093*): *A New Critical Edition and Color Facsimile* (Aldershot, 2008).

On the other hand, Villard's detailed drawings of existing architecture, for all their inaccuracies when compared to the buildings themselves (cf. Figures 1.2 and 1.3), of church furnishings (Figure 1.4), and of sculpture (Figure 1.5) could have had practical applications. I believe these drawings were made for a client, someone with a specific need and not merely a patron willing to support an itinerant artist. This could explain why these drawings are so detailed and demonstrate considerable care in the use of straightedges and compasses.

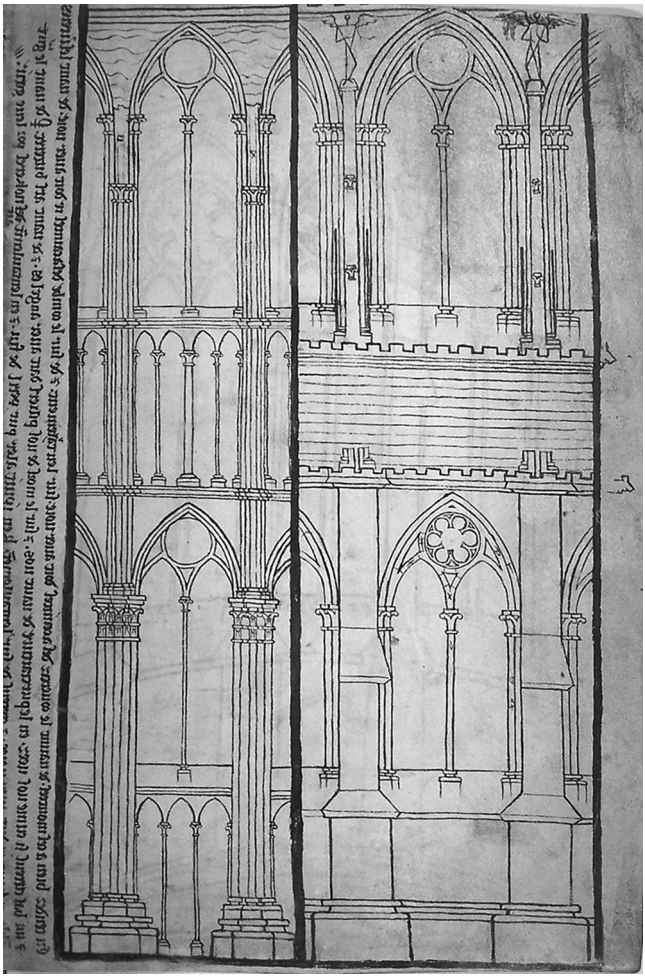

FIGURE 1.2 Portfolio of Villard de Honnecourt, fol. 31v: Reims Cathedral Main Vessel Bay Interior and Exterior Elevations, *c.*1220/40 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

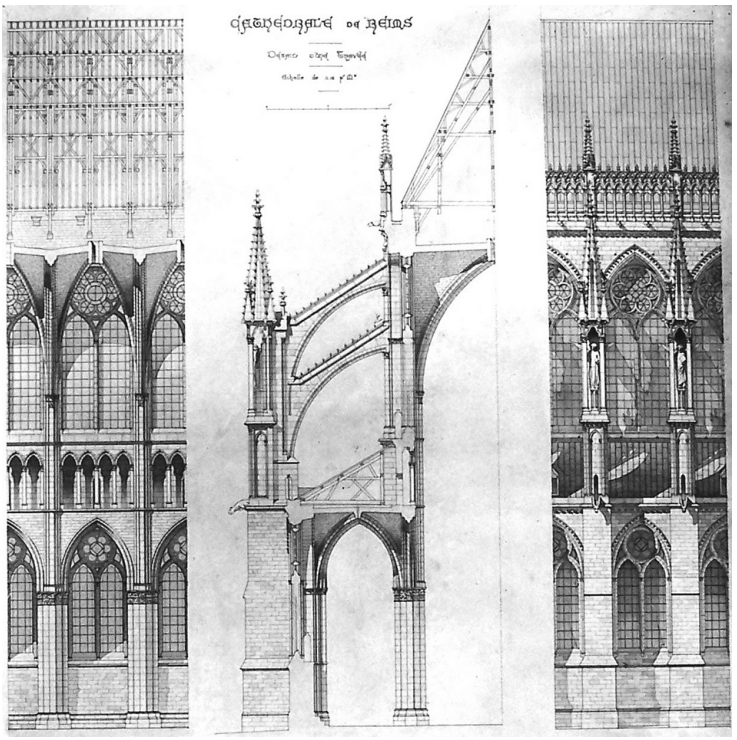

FIGURE 1.3 Reims, Cathedral of Notre-Dame: Main Vessel Bay Interior and Exterior Elevations and Cross Section by Henri Deneux, 1906
PHOTO: ARCH. PHOTO. © CMN, PARIS

Who was this client? The evidence is circumstantial, but a series of considerations suggest it was the bishop and/or the chapter of the Cathedral of Notre-Dame (Sainte-Marie) at Cambrai, now *sous-préfecture* of the département du Nord about 15 km (9.3 mi.) north of Honnecourt-sur-Escaut, the presumed birthplace of Villard. A new chevet was begun at Cambrai *c.*1220. Villard was there just when the chevet foundations were reaching ground level, and he made a detailed drawing of the plan on fol. 14v (Figure 1.6). The inscription added to the drawing by Villard, or his scribe says, "Here is the plan of the chevet of My Lady Saint Mary of Cambrai where it rises from the ground. Earlier in this book you will find the interior and exterior elevations, as well as the appearance of the chapels and lateral walls and that of the flying buttresses."[16]

16 vesci lesligement del chavec me dame / Sainte Marie de canbrai. ensi com il ist de / tierre. avant en cest livre en trouveres les / montees dedens et dehors. et tote le maniere / des capeles et des plains pans autresi. et li maniere / des ars boteres.

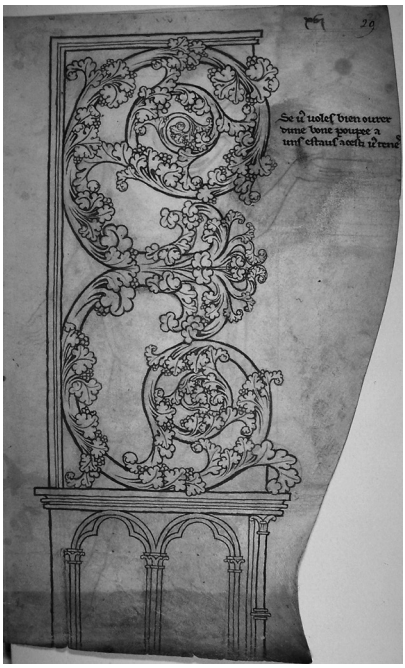

FIGURE 1.4
Portfolio of Villard de Honnecourt, fol. 29r: Choir Stall Poppet, *c.*1220/40 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

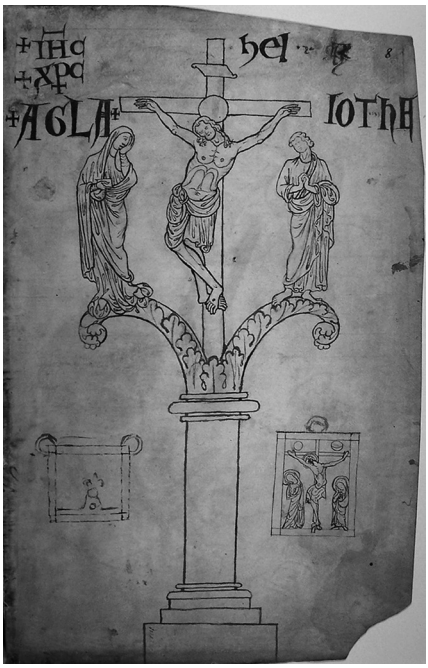

FIGURE 1.5
Portfolio of Villard de Honnecourt, fol. 8r: Crucifixion with the Virgin and Saint John the Evangelist, *c.*1220/40, with later additions (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

Villard's drawings of the Cambrai main vessel elevations, the chapels, and the flying buttresses have been lost from the portfolio, but they represent the same views that he drew of the Cathedral of Notre-Dame at Reims which do survive (fols. 30v, 31r, 31v, 32r). Hans Reinhardt even proposed that Villard's Reims drawings were actually of Cambrai, not Reims.[17] It could be mere coincidence that Villard's Cambrai and Reims drawings "match," had Villard not associated at least one of the Reims drawings with Cambrai. Next to his drawing of the interior of one of the radiating chapels at Reims, the text refers to both the interior view (fol. 30v) and the exterior view (fol. 31r) (Figure 1.7): "Here is the correct elevation of the interior of the chapels of the church of Reims, level by level, from bottom to top. On the facing page you can see the exterior elevation

17 Hans Reinhardt, "Villard de Honnecourt," in *La cathédrale de Reims* (Paris, 1963), 83–88.

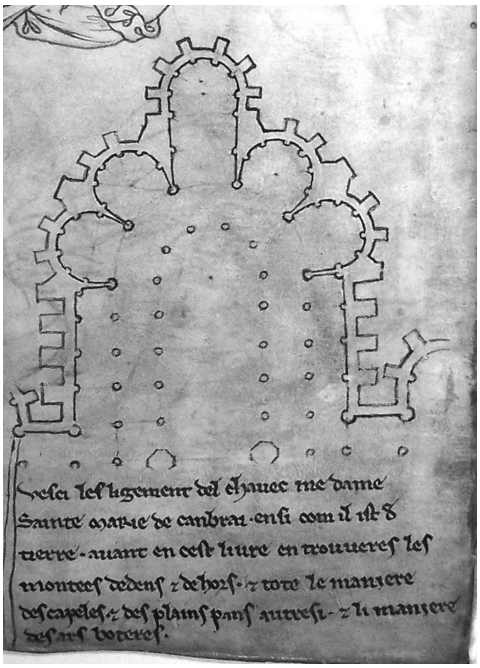

FIGURE 1.6
Portfolio of Villard de Honnecourt, fol. 14v, detail: Cambrai Cathedral, Plan of Chevet, *c.*1220/40 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

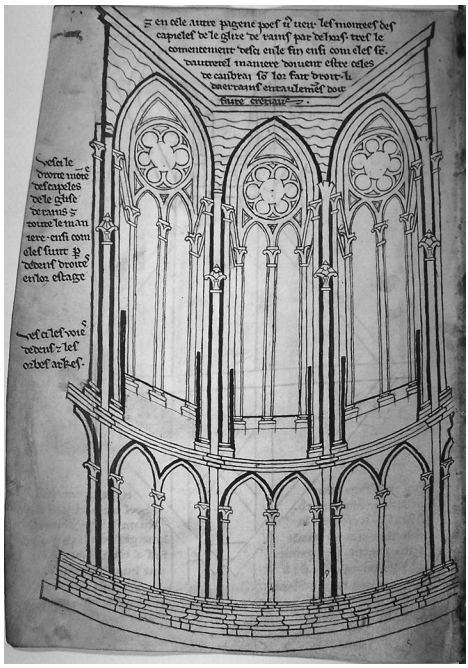

FIGURE 1.7
Portfolio of Villard de Honnecourt, fol. 30v: Reims Cathedral, Radiating Chapel Interior, *c.*1220/40 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

of the chapels of the church of Reims exactly as they are from top to bottom. The chapels at Cambrai must be similar to these if they are done correctly. The upper entablatures must have crenellations."[18]

At least one of the radiating chapels at Reims was completed by 1221. The text next to the drawing refers to the Reims chapels "as they are" (*ensi com eles sunt*) and to how the Cambrai chapels must look if they are done correctly (*son lor fait droit*), both verbs in the present tense. But I believe the sense of the reference to Cambrai implies the future, that is, "if they *will be done* correctly."

18 vesci le / droite montee / des capeles / de le glise / de rains et / toute le man / iere. ensi com / eles sunt par / dedens droites / en lor estage / / / et en cele autre pagene poes vos veir les montees des / capieles de le glize de rains par dehors. tres le / comencement desci en le fin ensi com eles sunt. / dautretel maniere doivent estre celes / d vesci e canbrai son lor fait droit. li / daerrains entaulemens doit / faire cretiaus.

Reims is 139 km (86.4 mi.) from Cambrai, perhaps a three-day trip on horseback, and I think Villard was sent by the bishop or chapter at Cambrai to Reims to make drawings of the new construction there for use in the *chantier* at Cambrai. A number of features at Reims intrigued Villard: the articulation of walls with blind arcades and, especially, the tracery in the windows.[19] Villard drew a window in the nave aisle at Reims (fol. 10v) (Figure 1.8), and the inscription with it tells us that, of some indefinite number of windows he saw at Reims, he liked this one best: "Here is one of the windows of Reims from the nave bays between two piers. I had been sent to Hungary when I drew it because I liked it best."[20]

The design and construction of the Reims windows was something radically new in Gothic architecture. For the first time, the tracery in the window was no longer constructed as was the wall framing the opening. The tracery was designed and cut separately to fit the opening and was then inserted—what Paul Frankl called "construction within construction." What was put in the early windows at Reims was not true bar tracery as seen in slightly later architecture, nor was it new when Villard encountered it. But it was *new to him*, and it impressed him. Otherwise he would not have gone to the trouble to show on fol. 10v both the section and the plan of the central mullion in the aisle window, nor would he have been so interested in the templates (*molles*; fol. 32r) for the tracery that he encountered in the Reims workshop (Figure 1.9).

Villard also drew, whether at Reims or elsewhere, designs for a choir stall seat and poppets and a lavish choir stall poppet on fol. 29r (Figure 1.4), a lectern, and both small-scale and large-scale sculptures (Figure 1.5), ideas that would have been useful models for clergy planning to furnish a new choir.

Three additional clues may associate Villard with Cambrai, and one of these might explain his trip to Hungary. Villard tells us twice (fols. 10v and 15v) that

19 M.F. Hearn, "Villard de Honnecourt's Perception of Gothic Architecture," in *Medieval Architecture and Its Intellectual Context: Studies in Honour of Peter Kidson*, ed. Eric Fernie and Paul Crossley (London, 1990), 127–36.

20 vesci une des formes de rains / des espases de la nef teles com / eles sunt entre .ii. piliers. Jestoie mandes en le tierre de hongrie qant io le portrais / porco lamai io miex. The reader of this essay, vetting it for AVISTA, objected to my including this inscription from the portfolio as being "confusing." Indeed it is so, being one of the more enigmatic of the inscriptions. The mystery is what, if anything, did the drawing of the Reims window have to do with Villard's trip to Hungary. The quote, puzzling though it may be, is included here for two reasons: it proves Villard's interest in the window tracery at Reims, and it is one of his two indications that he went to Hungary. For a more detailed analysis of this inscription, see Barnes, *The Portfolio* and idem "Villard de Honnecourt and the Cistercians," forthcoming in *Studies in Cistercian Art and Architecture*, vol. 7 (Collegeville, 2008).

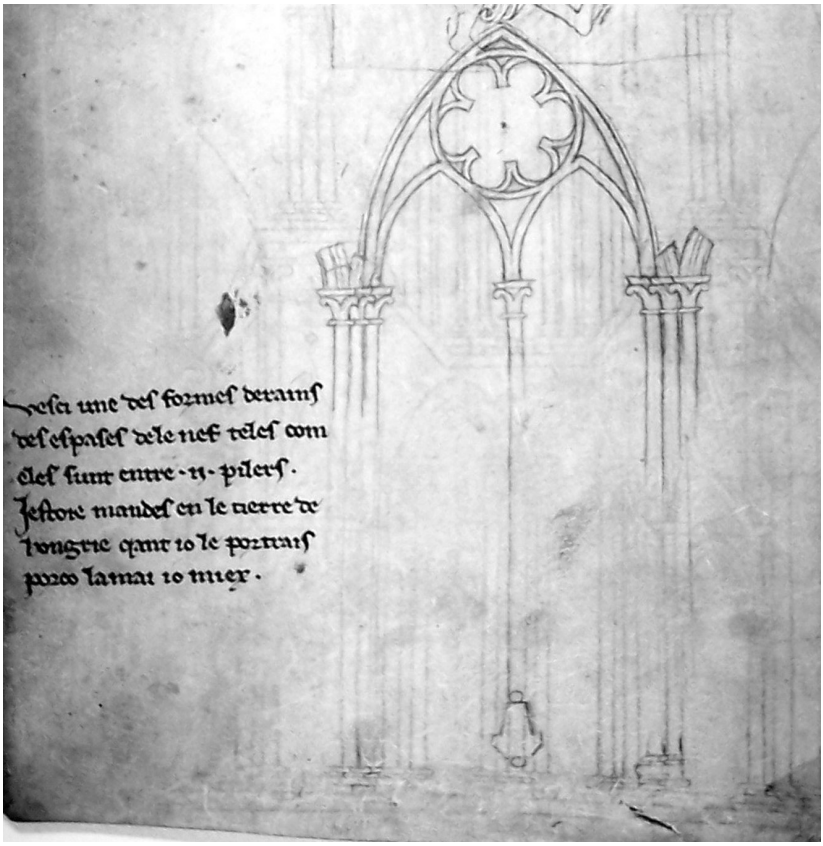
vesci une des formes dreins
des espaises dele nef teles com
eles sunt entre · ij · piliers ·
Jestoie mandes en le terre de
hongrie quant io le portrais
pour la mai io mier ·

FIGURE 1.8 Portfolio of Villard de Honnecourt, fol. 10v, detail: Reims Cathedral, Nave Aisle Window, *c.*1220/40 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

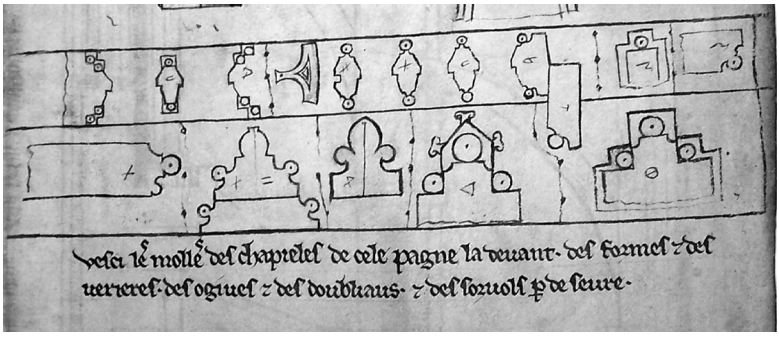
vesci le molle des chapeles de cele pagne la deuant · des formes · des
uerreres · des ogiues · des doubliaus · des sozuols p de seure ·

FIGURE 1.9 Portfolio of Villard de Honnecourt, fol. 32r, detail: Reims Cathedral, Rib and Tracery Templates, *c.*1220/40 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

he was in Hungary. He tells us on fol. 10v that he was sent (*jestoie mandes en le tierre de hongrie*) and on fol. 15v that he stayed there a long time (*u ie mes maint ior*), but he does not tell us who sent him or why he was sent. I believe he could have been sent on a specific errand by the Cambrai chapter. To justify such a speculation, it is necessary to examine the connection between the Cambrai chapter and St. Elisabeth (Erzsébet) of Hungary. She was born in 1207, daughter of King Andreas II of Hungary and Gertrude of Andrechs-Merania, who was murdered in 1213 when Elisabeth was six years old. Elisabeth was a niece of Agnès of Andrechs-Merania, who was wife of King Philip Augustus II of France from 1196 to 1200. Renowned for her piety and generosity to the poor, Elisabeth died on 17 November 1231 and was canonized four years later on 28 May 1235. She was buried in the Elisabethkirche in Limburg-an-der-Lahn.

In 1227 Elisabeth made a gift to the chapter at Cambrai, and the chapter instituted a Mass in her honor in 1232, three years before Elisabeth was proclaimed a saint.[21] My interpretation of Villard's trip to Hungary is that he may have been sent there by the chapter of Cambrai in or shortly after 1235 to obtain a relic of their patron. He must have returned to France by 1239, for in that year one of the radiating chapels in the new cathedral chevet was dedicated in her honor.

The chronology of these events can thus be summarized in tabular form as:

*c.*1220	New chevet begun at Cambrai
1227	Elisabeth made a gift of gold to the Cambrai chapter
1231	Elizabeth died, 17 November
early 1230s	Villard's drawings of Cambrai chevet
1232	The Cambrai chapter instituted a Mass in Elisabeth's honor
1235	Elisabeth canonized, 28 May
1235/39	Villard sent to Hungary to obtain relic of Elisabeth
1239	Cambrai chapter dedicated a radiating chapel in the new choir to Elisabeth

21 J.B.A. Lassus believed that Villard was the architect of Cambrai and, due to his fame as such, was called to Hungary to build a church dedicated to St. Elisabeth at Kassa (now Kosice, Slovakia). Lassus noted the generosity of the saint to the chapter of Cambrai, and that she "ayda par or et par argent à achever ledit [= Cambrai] choeur." (Lassus, J[ean]-B[aptiste]-A[ntoine]. *Album de Villard de Honnecourt: Architecte du XIIIe siècle, manuscrit public en facsimile*. (Paris, 1858; Photographic reprint [Paris, 1976]), 99. This same theme, including the idea that Villard may have been the architect of Cambrai, reappeared in Wim Swaan, *The Gothic Cathedral* (London, 1969), 96.

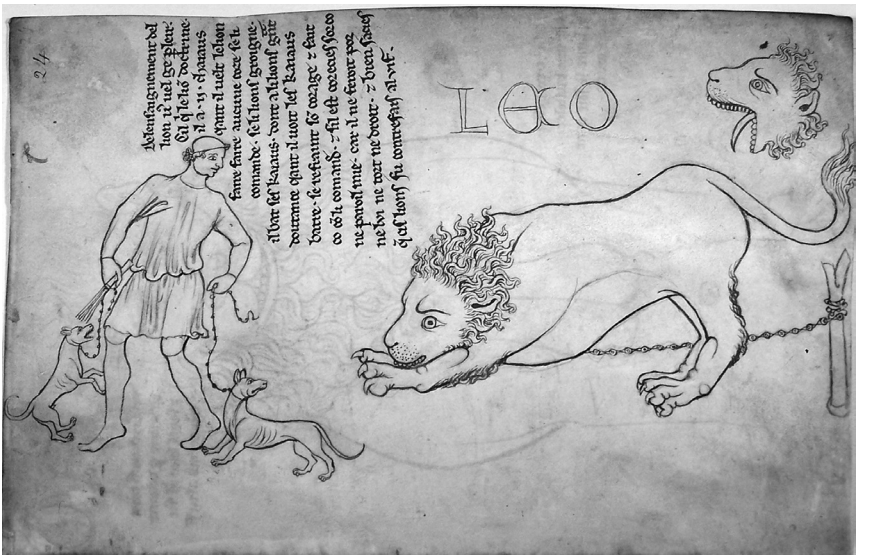

FIGURE 1.10 Portfolio of Villard de Honnecourt, fol. 24r: Lion Training, *c.*1220/40 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

Yet another potential Villard-Cambrai tie has to do with Villard's celebrated lion, a frontal view drawn on fol. 24v and a drawing and explanation of how a lion is trained on fol. 24r (Figure 1.10). There is much debate about the source or model for Villard's frontal lion, but to me the most convincing explanation is that it was a sculpted corbel formerly in the porch on the south transept façade of the Cathedral of Notre-Dame at Chartres.[22] However, there is nothing sculpted or painted surviving at Chartres that could have served as the model for the lion training drawing. This drawing closely follows a written explanation of lion training found in a book, *Liber de natura rerum*, written by Thomas de Cantimpré, a canon in the chapter at Cambrai from 1217 to 1235. The "whipping-boy" approach to lion training goes back to antiquity, to Aristotle for example, and was, admittedly, widely known animal lore. But there is another possible tie between Villard and *Liber de natura rerum*. On fol. 24v, where Villard drew the frontal lion, he also drew a porcupine, explaining that it is a "little beast that throws its quills when angered." The same myth is recounted in de Cantimpré's book.

22 Peter Kidson and Ursula Pariser, *Sculpture at Chartres* (London, 1958), 53.

A final possible link between Villard and Cambrai is his drawing on fol. 27r of the martyrdom of Sts. Cosmas and Damian. The inscription explains the subject of this very carefully executed drawing (vesci le labitement / saint come et saint / domiien).

These two saints, brothers who were martyred in Cilicia during the reign of Diocletian, were popular in 13th-century France. Of the French cathedrals, Cambrai had a chapel in the north aisle of the chevet dedicated to them as did the Cathedral of Sts. Gervase and Protase in Soissons. Villard's drawing by itself, then, cannot prove a certain association between Villard and Cambrai.

Indeed, none of the considerations discussed above individually or collectively proves infallibly any association or relationship between our wandering artist and the cathedral chapter at Cambrai. Yet in their totality these five clues—Villard's plan of the Cambrai chevet, his comparison of the Reims radiating chapels with those at Cambrai, the relationship of the Cambrai chapter with St. Elisabeth of Hungary and Villard's trip to Hungary, his drawing of lion training as described in Thomas de Cantimpré's *Liber de natura rerum*, and his drawing of the martyrdom of Sts. Cosmas and Damian—collectively make it reasonable to posit that whatever his profession, Villard de Honnecourt served as a lay agent for the Cambrai chapter.

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CHAPTER 2

Villard de Honnecourt: Gothic Carpenter

George Brooks

The manuscript left to posterity by Villard de Honnecourt is arguably the most significant surviving document concerning art and technology from the Gothic period.[1] It is also a frustratingly enigmatic artifact. Its significance is twofold: it is the only extensive manuscript involving Gothic art and engineering from the height of the cathedral building endeavors of the 13th century; and it contains more technological devices, and of a wider variety, than any other single source from Western Europe during the whole of the Middle Ages. The hundreds of images Villard rendered treat aspects of architecture, masonry, carpentry, geometry, portraiture, sculpture, metalworking, church furnishings, structural and mechanical engineering, fine and speculative technology, flora and fauna, and other curiosities noted in his travels. The astounding variety of the manuscript's contents is what makes it so puzzling; the breadth of topics, the sheer variety of the evidence, has confounded attempts to define the training and profession of its author (Figures 2.1, 2.2, 2.3 and 2.4 from Villard's Portfolio show this variety: carpentry, masonry, architecture, art). The manuscript is all the more difficult to interpret because it is a unique survival, with nothing comparable from Western Europe until the *Texaurus* of Guido da Vigevano a century later, and the many handbooks of German and Italian engineers which span the 15th century. No other document so enriches our appreciation for the imaginative era which produced the most awe-inspiring architectural achievements of the Middle Ages, yet we still know almost nothing about the author or the purpose of his manuscript—we have yet to solve "the problem of Villard de Honnecourt."[2] This essay is an attempt to finally resolve at least part of this mystery.

1 An earlier version of this essay was published under the same title in *AVISTA Forum Journal* 18 (Fall 2008).

2 As it was expressed by Carl F. Barnes, Jr., one of the leading American authorities on Villard de Honnecourt, who led the charge against the entrenched notion that Villard was professionally an architect or master mason. Professor Barnes has eased the labors of all students of the Villard manuscript with his critical annotated bibliography of publications and references to the 13th-century Picard draftsman (he was loath to credit him with much more of a title) in his *Villard de Honnecourt: The Artist and His Drawings* (1982). Until his death, Barnes maintained the authoritative website on Villard, providing scholars with access to his updated and ongoing bibliography of all significant Villard references, which is now housed and maintained at

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FIGURE 2.1
Portfolio of Villard de Honnecourt, fol. 6v: Wooden Clocktower (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

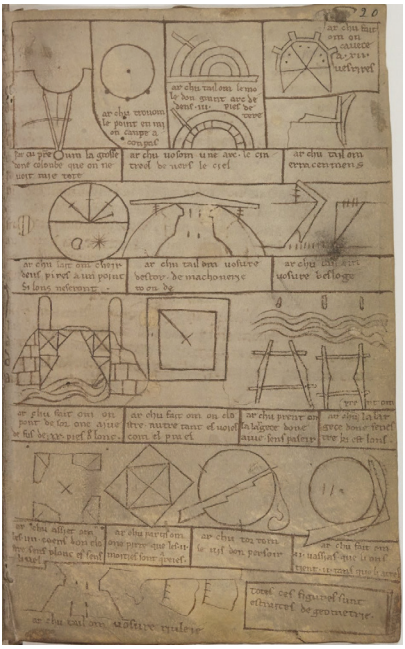

FIGURE 2.2
Portfolio of Villard de Honnecourt, fol. 20r: Masonry Instructions by Master II (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

Villard de Honnecourt is known only through the images and inscriptions in the manuscript which bears his name—a situation that has enabled sometimes wild and rhapsodic interpretations. Jules Quicherat, who first announced the discovery of the manuscript in 1849, declared that Villard was an architect, based on the many renderings of parts of great Gothic cathedrals and church plans, as well as the depictions of masonry and stereometric techniques; and so for the 19th century Villard was romanticized as a famous architect of Gothic cathedrals. This view was slowly abandoned by serious students of the Villard manuscript following the publication in 1901 of an analysis by F.E. Schneegans which showed that there were at least two other discernible hands in the

the AVISTA.org homepage. In his final years, Barnes completed his *magnum opus*, a facsimile and critical analysis of every aspect of the Villard manuscript, informed by his career-long study of the Portfolio (as he insists it should be called) and the first ever with every page reproduced in full color and at their actual size.

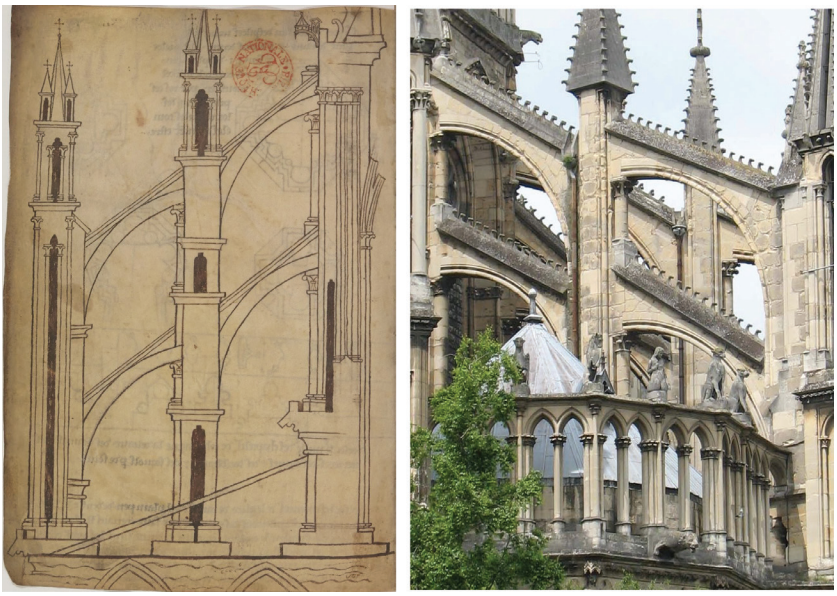

FIGURE 2.3A–B Portfolio of Villard de Honnecourt, fol. 32v: Reims Flying Buttress (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF. PHOTO: AUTHOR

manuscript besides Villard's, one of whom made the depictions of difficult masonry subjects on fol. 20 (Figure 2.2).[3] Despite this seminal discovery, Villard

3 Schneegans designated these other two hands as Master II and Master III, but in the reverse order from which students of the Villard manuscript know them today. This was due to the Hahnloser facsimile of 1935 which was the first to analyze the document with knowledge of its multiple authors; but Hahnloser believed Schneegans's chronology to have been in error and so reversed the designations. Thus, Schneegans referred to the masonry drawings of folio 20 as the work of Master III, but Hahnloser, and after him all students of the manuscript, have referred to him as Master II. However, in Barnes's facsimile edition of the Portfolio published just prior to his death and informed by a new examination of the manuscript (his third) in 2003, Barnes concluded that there were at least eight hands that had contributed to the manuscript, dubbed "Hands 1–8." Barnes returned to the chronological designations of Schneegans, having decided that Hahnloser was in error in reversing them, but most radically, drew the conclusion that the difficult masonry subjects on the palimpsests of 20r and the top of 20v were by a yet different, hitherto unrecognized, hand. Thus, Villard de Honnecourt is "Hand 1," but Hahnloser's Master 2 and Master 3 are now reversed (again), and the masonry subjects which had been attributed to Hahnloser's "Master 2" (Schneegan's "Master 3") are now ascribed to "Hand 4"—a completely new argument in Villard manuscript attribution. Note also that Barnes has removed the designation "master" from all "hands" in the manuscript as being unsupported by any strong evidence. Whether the advanced masonry concepts were drawn and annotated by a "Master II" or a "Hand 4" has no impact on this

FIGURE 2.4
Portfolio of Villard de Honnecourt, fol. 2v: Crucifixion (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

has persisted in popular studies as an architect and master mason; medievalists, however, have spent the last century in a protracted battle over the question of Villard's professional status, producing varying schools of thought.[4] In brief, Villard's manuscript has been characterized as an *album* of useful techniques and personal notes (the "French school");[5] as a Lodgebook or *Bauhüttenbuch,* intended to be a manual of instruction for the members of a builder's lodge which Villard once headed (the "German school");[6] as a model book of designs and patterns useful to the Gothic artisan;[7] and as a comprehensive

essay—the salient point is that these drawings are *not* by Villard. As it does not affect our assessment of Villard, and to maintain clarity for the reader who, if knowledgeable about Villard scholarship, will be accustomed to Hahnloser's designation for the unknown person who improved the masonry instructions in the Villard manuscript, he will continue to be referred to as "Master II" in this essay. Barnes, *Facsimile*, 13.

4 See the thorough summary of the various schools of Villard interpretation in Barnes, *Villard*, XXVI–XXVII.

5 Beginning with Quicherat (1849) and including most French scholars.

6 Hahnloser (1935), Bucher (1979).

7 An "international" school with many adherents.

encyclopedia and textbook of Gothic architecture.[8] The popular view of Villard as architect or mason has been vigorously challenged by Carl Barnes, who put forth a comprehensive list of ten reasons why Villard de Honnecourt could not have been either,[9] and draws these conclusions on the state of the Villard question:

> The "Problem of Villard de Honnecourt" remains to be solved. My challenge to the tradition that Villard was a Gothic architect belittles neither him nor his drawings. Villard was, in the best sense of the word, a dilettante, "one who delights in the world around him." No profession explains the multiplicity of Villard's interests, and we are the richer for it.
>
> My challenge to the view that Villard was a master mason is to try to break down the stereotype of Villard. Only if we escape this bind can we look freshly at, and learn anew from, Villard's portfolio of drawings. By this means alone can we see Villard's work freshly, and with the same engaging enthusiasm with which he viewed the world around him. And therein lies the hope of someday solving the "Problem of Villard de Honnecourt."

And there the problem has stood. Over a century and a half has passed since this manuscript first came to the attention of scholars, yet we still do not know whether to call Villard de Honnecourt an architect, a mason, an artisan, an engineer, a dilettante, or a "clerk with a flair for drawing"[10]—neither do we know whether we should call the artifact he left us an *Album*, a *Sketchbook*, a *Lodgebook* a *Portfolio*, or simply a unique manuscript. Scholarship across the 20th century has for the most part only produced arguments about what Villard *was not*, without providing a convincing argument about what he *was*. We would very much like to know what Villard de Honnecourt actually did for a living, and what his training consisted of, but every theory offered concerning his professional activities fails to explain some aspect of the manuscript's widely varied images, or some shortcoming in Villard's representation of them. Many art and architectural historians have abandoned the question of Villard's identity and professional status as unsolvable, but an answer may be possible.

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8 Harvey (1950), Jantzen (1957), Frankl (1960).

9 Barnes, "The 'Problem' of Villard de Honnecourt" (originally published in French in *Les Bâtisseurs des Cathédrales Gothiques* (Strasbourg, 1989), 209–23); available in English translation on the AVISTA.org website.

10 Robert Branner's comment in JSAH 32 (1973), cited by Barnes as the inspiration for his renewed look at Villard (Barnes, *Villard*, 89).

A review of the most important of these problems of interpretation is necessary before we attempt a resolution of the Villard problem.

1 The Villard Manuscript—Evidence and Inferences

Villard introduces himself and his book on the verso side of the first folio, providing information that is invaluable, if somewhat ambiguous:

> Wilars dehonecort greets you and prays to all who will use the devices (*engiens*) found in this book (*livre*) that they will pray for his soul and remember him, because in this book you can find good counsel (*grant consel*) on the great techniques of masonry (*grant force de maconerie*) and on the devices of carpentry (*des engiens de carpentrie*). Also, you will find the great technique of portraiture (*grant force de le portraiture*) as the discipline of geometry (*de iometrie*) requires and instructs.[11]

Villard's greeting is to an unspecified audience, but he clearly intended his book to be of use to others, and only asked that they "pray for his soul and remember him"—a standard declaration made also by Theophilus.[12] Villard summarizes the important elements of his book as "masonry" and "carpentry," along with "portraiture" and the techniques of "geometry" which facilitate it. It is also critical to note what Villard does not say. Nowhere in his book does he claim to be an architect, nor does he claim any specific title or career for himself. He only describes what his book contains and assures the reader that it would provide "good counsel" for those who would use it. Villard never specifically states that he oversaw, or even worked at, any of the sites referenced in his drawings, nor does his name appear among the architects and masons known to have worked at the sites Villard recorded. We cannot be sure that he visited all the sites he references, as he might have made some of his drawings from the designs of other builders that he encountered traveling with their own collection of drawings similar to Villard's. Villard twice tells us that he went to Hungary, where he stayed "many days," but we know nothing certain about what he did or how long he was there. Villard implies that this trip to

11 All translations from Villard's Portfolio are those of the Barnes facsimile, but I sometimes alternate between his "free translations" and his literal renderings depending on which best clarifies the point.

12 Theophilus, *De diversis artibus*. Translated by John G. Hawthorne and Cyril Stanley Smith (1963).

Hungary was a singular event in his life, but the lone image surviving from that journey is a series of tile patterns that he found interesting (15v); beyond that, the contents of the Portfolio only attest to activity in northern France during the early 13th century. Other than Villard's mention of the trip to Hungary, and some curious comments concerning Cambrai Cathedral which we will examine shortly, his inscriptions add little to our knowledge of him or his whereabouts beyond what we can infer from the drawings. Based on what Villard tells us, we only know that he organized and inscribed his drawings with the intent that they would be useful to others, that he considered geometry essential to portraiture and masonry construction, that he once traveled to Hungary for some unknown project, and that he was somehow associated with Gothic cathedrals then under construction in northern France. We can also affirm that he was curious about many different things and possessed artistic talent, as evidenced by the variety and quality of his drawings which comprise most of what he left to posterity. Villard was certainly not a "writer" in our sense of the word, and the consideration of the sparseness and frequent inadequacy of his written inscriptions has produced the insight that "it is not an illustrated textbook; at the most it is a texted illustration book."[13] This is the limit of what we know assuredly. All else that has been or can be asserted about Villard de Honnecourt is an inference derived from his drawings, from less specific or subjective comments, from the arrangement of his materials, from his silence, or from the condition of the manuscript.

Nearly all the architectural drawings in Villard's Portfolio—plans, elevations, profiles, furnishings, and individual components—involve churches, mostly ones being built in the new "Gothic" style (*opus francigenum*) of his time; but what role he played in their construction, if any, is unknown. Although there is a plan for a trebuchet (30r) in his collection, there is little in the Portfolio to suggest that its author was employed in civil or military construction. Villard's career seems to have been firmly attached to church patronage, further suggested by his inscription accompanying the design of a "hand warmer" (9r): "This device is good for a bishop, who can be comfortable at High Mass because as long as he holds this device between his hands they will not become cold, if the charcoal stays hot." Villard rendered details of some of the most significant monuments of Gothic architecture—Chartres, Reims, Laon—as well as other area churches in Cambrai, Lausanne, Meaux, and Vaucelles, which would suggest that Villard enjoyed some kind of professional status, seemingly involved with some of the most important and best financed ecclesiastical construction

13 Lon Shelby, "Review of Hahnloser Facsimile," *Speculum* 50 (1975): 497.

projects of his day. There is a concentration of drawings from Reims Cathedral (30v–32r), including the details of moldings and templates, suggesting a deeper involvement with this particular church. There are also marks on various parts of the drawings which link specific templates to the architectural details where they were used.[14] There is also evidence of Villard's collaboration in the construction of Cambrai Cathedral. Its ground plan (14v) is Villard's most precise of five such plans rendered in the Portfolio and may have been copied from the original plans.[15] If Villard merited access to the plans of the guild, it must have been by reason of his close involvement with the project. He proudly enjoins the reader to "observe the plan of the chevet of My Lady Saint Mary of Cambrai, just as it rises out of the ground," indicating his presence during construction; and following this, he refers to a previous section of the book where he has drawn "interior and exterior elevations, as well as the appearance of the chapels and lateral walls and that of the flying buttresses"—all of which, regrettably, are now missing. That Cambrai and Reims were both major professional concerns to Villard is vaguely suggested by a comment which accompanies his rendering of the elevations of the Reims choir (30v):

> And on this other page you are able to see the elevation of the chapels of the church of Reims from their exterior … Of similar arrangement must be those of Cambrai if one makes them correctly. The upper entablatures must form crenellations.

Villard would seem to have been involved in some discussion concerning the elevations of Cambrai Cathedral, to which he has contributed a professional opinion—but it still does not clarify what his profession was. Only isolated parts of other churches appear in Villard's Portfolio—a tower of Laon (10r) and its plan (9v), the rose windows of Chartres (15v) and Lausanne (16r), a labyrinth

14 William W. Clark, "Reims Cathedral in the Portfolio of Villard de Honnecourt," in *Villard's Legacy: Studies in Medieval Technology, Science and Art in Memory of Jean Gimpel* (2004). Barnes argues that these marks are not by Villard but were added sometime after by the same hand that added the Roman numerals to Villard's trebuchet drawing. This hand got a few of them wrong, but Villard got most of the drawings and what they corresponded to correct: "Villard knew he was drawing from templates … and he knew what some of them were for, at least enough to distinguish ribs from masonry." Barnes, *Facsimile*, 207.

15 Robert Bork's monumental study of Gothic architectural drawing argues that while Villard's renderings are "wobbly" and "sloppily drawn," they nevertheless indicate some level of understanding of the geometry that underlies their design and "likely copies a drawing he had seen in the Cambrai workshop" Bork, *The Geometry of Creation: Architectural Drawing and the Dynamics of Gothic Design* (2011), p. 31.

of uncertain provenance (7v)—so we cannot affirm anything beyond the fact that Villard probably visited these churches and drew things that were for some reason significant to him. Villard left a rare personal comment alongside a drawing of a window at Reims (10v), which he drew "because I liked it best."

Architectural historians have scoured these churches and their related documents looking for some evidence of Villard's involvement with them. The names of several Gothic architects and master masons in the time that Villard was active are known to us from church records and from inscriptions in the cathedrals they worked on. Some are even portrayed in the cathedral's sculptural details. Villard appears in no record, no inscription, no carving, no epitaph—no place outside of his Portfolio. Many scholars have also noted that Villard's architectural renderings invariably differ from the actual structures in ways that seem reckless if these were meant to be models for builders to follow. His drawing of the flying buttresses of Reims Cathedral, for example, alters the proportions to such an extent that if constructed as pictured, they would likely collapse (Figure 2.3).[16] Villard has a noted tendency to slenderize his architectural drawings, and he often omits details, adds them in, or alters them. He added additional florets to his drawing of the Chartres Rose window; and his drawing of the Lausanne Rose differs radically from the original, but whether he "botched it" or "modernized" the design has never been agreed upon.[17] Having made no claim to being an architect and faced with architectural drawings that consistently diverge from reality, we have no basis beyond the fancies of neo-Gothic enthusiasts to declare that the author of the Portfolio was the architect of any Gothic church. A good deal of 20th-century scholarship on Villard has been devoted to exposing the errors and inadequacies of the architectural material in the manuscript, and in digesting the realization that the difficult masonry techniques on both sides of folio 20 are not by Villard but are the palimpsests of Master 11. Far from the 19th-century opinion of

16 Fitchen (1961), Branner (1963), Kidson (1981), Wilson (1991), and Clark (2004) all argue that Villard did not comprehend the geometrical design of the architecture he rendered, especially at Reims where his "liberties" would have been disastrous if followed by builders. Kidson delivers this pronouncement: "The man who drew the elevation of Reims (31v) knew nothing of the geometrical system which determined the relations between its stages. What he drew was nonsense—something which betrays either a garbled misunderstanding or else total ignorance of the ways in which contemporary cathedral designs were put together." Kidson, Review of Bucher, quoted from Barnes, *Villard*, 330.

17 Bucher earlier thought that Villard had "botched it" (1968), but later adopted the view of Durand (1881) that Villard 'modernized' his designs. Bucher claimed (1979) that Villard "would have judged the window to be very archaic, and unsuccessfully tried to modernize the tracery" (*Architector*, 102).

Villard as one of the greatest architects of his age, scholarly criticism across the 20th century has persistently denigrated his presumed credentials. Villard may have worked at some or all of the churches he renders in his drawings, but we shall have to locate a profession for him somewhere outside the realm of architect or master mason.

It is difficult to determine how much material has been lost from the Portfolio, but it is certain that losses have occurred. A 15th-century notation on the back of the manuscript, as currently bound, reads: "In this book there are forty and 1 leaves. J. Mancel." Since there are now only 33 leaves in the Portfolio, we are certain of the loss of eight folio pages between the 15th-century pagination and the 18th century when the present Arabic numbering system was added to the upper right-hand corner of the *recto* faces, ever since the standard reference system. For the purpose of binding, Villard gathered his folios into quires, of which there are now seven in the Portfolio. Hahnloser's disassembly of the manuscript in 1926 revealed gutter fragments that indicated the loss of many leaves, particularly from quires five and seven, which were gutted of most of their original contents. Estimates on the extent of losses to the original collection range from a minimum of 13, but likely 15 folio leaves (Barnes), to a maximum of 31 (Hahnloser)—in other words, roughly one third to one half of the manuscript is missing. We know from direct inscriptions concerning images and instructions no longer in the manuscript that among the missing pages are the large group of Cambrai images referenced earlier, and a side elevation of a trebuchet referenced in an inscription beside the schematic rendering of it (30r). And from the introductory address to his readers, in which advice on *des engiens de carpentrie* is promised, we can conclude that this "chapter"[18] was also at some point removed from Villard's manuscript (a point to which we shall return). Thus, all students of the Portfolio must bear in mind that what we have to study is a *fragment* of the work of Villard de Honnecourt.

Certain inferences may be drawn from the manner in which Villard arranged his material. We cannot be certain if all the folios are in the same position in the Portfolio as Villard left them, missing folios notwithstanding, so scholars have been forced to interpret the manuscript without regard to this question.[19]

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18 Some will protest the use of "chapter" in reference to Villard's divisions as being overly formal for a collection of loose drawings only later bound into a "portfolio"—but given that Villard referred to his effort as a "book" (*livre*) and clearly made an effort to organize within it sections on masonry, carpentry and portraiture, I do not think it inappropriate to use the term—the reader will know that it is applied somewhat loosely to refer to the "sections" or "gatherings" that Villard compiled on these topics.

19 Barnes reports that Hahnloser had complained bitterly that the book was rebound differently after his 1926 examination, and that several of the gutter fragments had been lost.

As it now exists, the Villard manuscript may be organized according to the following table:

THE *PORTFOLIO* OF VILLARD DE HONNECOURT ANALYZED BY QUIRES
(*The table of quires indicates in standard font what appears to be the theme or major topic(s) of each quire, while the parenthetical additions indicate in italics the seemingly secondary material that had to be included because they were drawn on the same folios*)

Quire 1 (1r–7v):	Figural drawings of humans, animals, foliage heads, and Villard's greeting (perpetual motion wheel, clocktower, lectern, labyrinth)
Quire 2 (8r–14v):	Figural drawings, mostly human, many of them draped, one nude figure (hand–warmer, cantepleure, two Laon architectural drawings)
Quire 3 (15r–17v): *Several missing folios*	Architectural plans and rose windows (page of trusswork, Hungarian tiles, lantern, three human figures)
Quire 4 (18r-21v):	Chapter on portraiture and Master II's chapter on masonry ("Wheel of Fortune" and inscriptions by Master III)
Quire 5 (22r–23v): *Severely gutted*	Two single folios remain, each with advanced carpentry techniques and machines on one side (various human, animal, and foliage head figures on the reverses)
Quire 6 (24r–31v):	Most varied quire, roughly divided into quarters: Lion training and animal studies, human figures, foliage designs, Reims elevations (trebuchet diagram)

Barnes's examination could neither confirm nor deny this, and notes that the manuscript has likely been rebound at least once before. Barnes, *Villard*, xx.

Quire 7 (32r–33v): *Severely gutted*	One bi-folio remains, with more Reims material: details of moldings and templates, drawing of flying buttress system (Back page: r. Villard's recipes, v. various post-medieval inscriptions)

The arrangement of subjects within their quires reveals an organizational scheme. The bulk of the purely artistic figural renderings are grouped in the first two quires. Following that is a collection of architectural ground plans and rose windows which happen to share a bifolio, along with a single folio containing another ground plan and some scattered figures, which are all that remain of quire three (henceforth Q3, etc.). Then come the "chapters" promised in the introduction: portraiture and masonry. Both arts are instructed by geometry, and they together comprise Q4. Q5 contained the missing section on carpentry, of which only some advanced devices remain. Villard also made drawings of things merely because he found them interesting but were not specifically related to matters of church construction. Such drawings that are not easily categorized follow in Q6, with many of the figures seeming to have been dragged along in order to keep all the lion drawings together. The one bifolio remaining of Q7 contains more Reims material which needed to be kept with its relatives at the end of Q6. Likewise, Q2 and Q3 have architectural plans facing each other, which seem to have determined their positioning. Thus, Villard gives every appearance of doing his best to arrange his material logically into quires, and then arrange the quires into a sensible, connected sequence. Given the scattered nature of the images on the loose folio leaves with which he started, it appears that Villard organized them within the limits of the logical possibilities. Scholars who insist that Villard's drawings form no book at all, but only a hodgepodge of scattered interests,[20] are guilty of applying persnickety modern standards of what a book is to a craftsman and nonacademic, living over two centuries before the printing press, who merely wished to make his professional notes available to any who might use them. Given the minimal training in "bookish" culture which we can reasonably ascribe to Villard, this artisan seems to have done, as Vitruvius did before him, an admirable job of making his lifetime of accumulated know-how sensible to any apprentice being trained in the same tradition—although it would certainly seem impenetrable to scholars (medieval and modern) who have never been on a construction site.

20 Pillion (1949) described the Portfolio's subject matter as "*pêle-mêle*." Barnes, *Villard*, xxvi. I disagree with Barnes's final assessment, that "there is no discernible rationale to the whole." Barnes, *Facsimile*, 6.

We may also safely conclude, from the preponderance of figural drawings, done in a consistent and confident hand, that Villard de Honnecourt was a trained artist. This does not, of course, preclude Villard from being also a builder and possessor of other technical skills; but the one thing that cannot be denied is that the representational arts were among Villard's accomplishments, even though we cannot enunciate a precise list of the media in which he worked. Medieval sculptors were typically able to work in both stone and wood, and it is not uncommon for them to work in metal and ivory as well.[21] We may note, however, that some of the figures are so extended in their positioning that they would have been difficult to render safely in stone, except in relief, such as the *Crucifixion* on 2v, which suggests that it was intended as a design in wood or metal (Figure 2.4). Barnes suggested that Villard was in fact trained as a metalworker based on the six-step process by which he drew, which Barnes compares to niello-work methods, and the distinctiveness of Villard's drapery rendering technique—*muldenfaltenstil*, or "trough-fold" style—that appears in some late 12th-century French metal statuary and has been associated with the workshop of Nicholas of Verdun. Barnes further observes that Villard seems much more capable of rendering small subjects, like figures, animals, and sculptural details, than accurately rendering large scale subjects like architectural profiles, which have long been criticized for their deviations from actual appearance. Barnes concludes that, "we have in these small drawings the habits and skills of a man accustomed to working at a small scale, not the gigantic sizes of buildings," and further, that "it is not necessary to associate Villard with any profession, but if one insists on doing so, metalwork rather than architecture, is the best possibility."[22] All of this is speculation: as with many points of argument concerning the ultimate purpose of the Portfolio, and the professional talents of its author, there are representative examples of so many diverse things that almost any position can find some justification. Barnes's suggestion of metalworking as Villard's training rests largely on his distinctive use of *muldenfaltenstil*, but this "trough-fold" style is not limited to metalwork, appearing as a stylistic convention in stone, wood, and manuscript paintings contemporary to Villard's drawings. A comparison of Villard's drawing of *Humility* (3v) with statuary from the exterior of Reims Cathedral, a polychromed oak *Virgin and Child* from northern France (*c*.1210–20), and a *Virgin at Pentecost* from the Ingeborg Psalter (*c*.1195), makes clear that *muldenfaltenstil* crossed over into other types of artistic production and thus cannot serve as an argument for Villard's specialization in any one of them (Figure 2.5). In the absence of very much

21 That medieval artisans were often skilled in multiple media is well attested. One need only consider that Theophilus's *De diversis artibus* provided instruction in painting, stained-glass making, and metalwork.

22 Barnes, "Problem," reason 10.

FIGURE 2.5

Muldenfaltenstil:

A Portfolio of Villard de Honnecourt, fol. 3v, detail: "Humility" *c.*1220 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

B Stone Sculpture, "A Queen from the Court in Heaven" in the 'Last Judgment' at Reims Cathedral: east portal, north transept, *c.*1236–40
PHOTO: JENNIFER M. FELTMAN

C Polychromed Oak, "Virgin & Child," Northern France, *c.*1210–20 (Metropolitan Museum of Art)
REPRODUCED BY PERMISSION OF THE MMA

D Ingeborg Psalter, "Virgin Enthroned" (detail), Illuminated Manuscript (Musée Condé de Chantilly, France), *c.*1195

significant material pertaining to metalworking in the Portfolio, and given that Villard does not reference such a chapter in his greeting, Barnes's observations only reinforce what we have long known and what even a casual perusal of the Portfolio reveals: whatever else he may have been, Villard de Honnecourt was well practiced at figural drawing and probably possessed the skill to render his figures in many media.

Our review of the major strands of scholarly thought on the "problem of Villard de Honnecourt" has brought us to the standard recurring conclusions. It has long been impossible to think of Villard as an architect; and despite the efforts of Hahnloser and Bucher, there is no getting around the "problem of Master II" in assigning to Villard the title of mason.[23] Villard drew many architectural subjects, and in rendering plans and molding profiles shows more than an aesthetic interest in masonry; but Villard does not exhibit the habits of a mason in his method of rendering any of it, nor have most architectural historians found his drawings competent enough to serve as the basis of any kind of construction. From the other direction, it is also indefensible to reduce Villard to Branner's "clerk with a flair for drawing," as he was clearly well trained as an artist; furthermore, his drawings indicate knowledge of constructional details and mechanical devices of great sophistication, beyond what a clerk could be expected to know. Villard could not have been an architect, nor was he any sort of mason; but he must have been more than an artist, more technically minded than a dilettante, and certainly more than a clerk. So, what else is left? There is but one profession to account for the variety of the Portfolio's contents, and the apparent shortcomings of the author, as well as certain strengths which have until now been overlooked: the contents of the manuscript left by Villard de Honnecourt are the heavily pillaged notes of a skilled carpenter of the Gothic era.

2 Five Reasons Why Villard de Honnecourt Must Have Been a Carpenter

2.1 *A Lost "Chapter" on* engiens de carpentrie

Villard's Portfolio originally contained a section on carpentry. Villard tells us in his greeting (IV) that the reader will find in his book instruction in masonry

23 In light of the problem of Master II and Villard's own shortcomings as a mason, Bucher wrestled with the question of what to call Villard, terming him at various times an "architector," a "master mason," a "minor mason," and finally a "mason subcontractor"—one can sense his reluctance to abandon the view of his own teacher, Hahnloser, who had fixed in Bucher the "Lodgebook" notion.

(*maconerie*), carpentry (*des engiens de carpentrie*), and drawing (*portraiture*) as taught by the discipline of geometry (*de iometrie*). In the Portfolio, as we now have it, there is an organized study of drawing using geometrical aids, followed by masonry instructions, but there is no similar compilation of carpentry techniques. This chapter was apparently borrowed at some point after Villard assembled his Portfolio and not returned. It was surely the subject of Q5, of which only two folio leaves remain, each with Villard's most advanced machines and carpentry techniques on one face, and figural images on the other. It follows Q4, which are Villard's most organized and focused sections, concerning portraiture and masonry. Given the "table of contents" that Villard provides in his introduction, the placement of the gutted Q5 just following it, with remnants that illustrate the advanced techniques of carpenter-engineers, it is more than reasonably certain that the missing bulk of Q5 concerned carpentry.[24]

Most of what we still possess concerning Villard's carpentry is due to the editorial decisions he was forced to make in the compilation of his accumulated drawings. Since he had drawn varied subjects over many years on whatever folios were handy, it was impossible to divide all the individual images into neat categories. Several folios contain unrelated drawings, such as the wrestlers which share 14v with two architectural plans. This imperfect organization has had the fortunate consequence of preserving the variety of the Portfolio's contents, including specimens of Villard's carpentry such as the page with three roof trusses—a standard carpenter's task—and a wooden lantern turned on a lathe (Figure 2.6). Scattered throughout the manuscript are other devices made of wood: the design for a trebuchet (30r), a clocktower (6v), and a *perpetuum mobile* conceived in wood (5r) (Figures 2.1, 2.7 and 2.8). All of these examples occupy one side of a folio with different material drawn on the reverse. There are no folios that contain carpentry or woodworking on both faces. Given Villard's attempt at logical organization, any such folio would have been gathered with its relatives in Q5 and are subsequently among the missing folios that comprised the section on carpentry referenced in his greeting. We may rejoice that Villard considered his plan of Vaucelles more important than the trusses on the reverse, so that this folio became part of the architectural plans of Q3, thereby preserving the only page of basic carpentry in the book. That any of Q5 remains is most fortunate since whoever took these materials likely needed a

24 The large group of Cambrai images would seem to have been among the pillaged leaves of either Q3, where they would have joined the ground plans, including that of Cambrai, or Q7, where they would have logically followed the Reims collection which Villard links in his inscriptions.

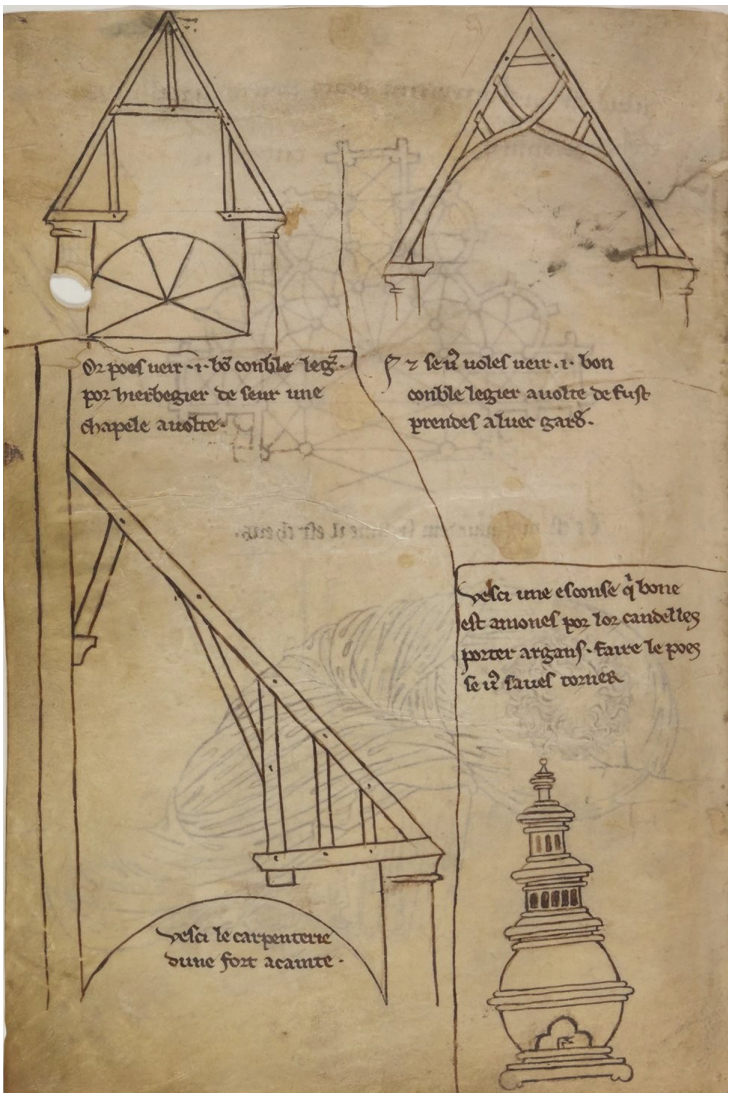
Or pues ueir .i. bō comble legier
por herbegier de seur une
chapele a outre.
& se tu uoles ueir .i. bon
comble legier a outre de fust
prendes a luer garde.
Pesca une es conse q bone
est a mouel por les candelles
porter a grans faire le pues
se tu saues corner
Pesca le carpenterie
dune fort a eautre.

FIGURE 2.6 Portfolio of Villard de Honnecourt, fol. 17v: Carpentry: Trusses & Lantern (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

manual of carpentry. That a chapter on carpentry is missing has been noted by students of the Portfolio, but the implications of this have not penetrated Villard scholarship.[25] From the beginning, scholars have assumed that Villard was

25 Hahnloser, Gimpel, Bucher, and others have noted this, but Villard remains an architect, mason, engineer, or sculptor for most scholars, including the ones just named.

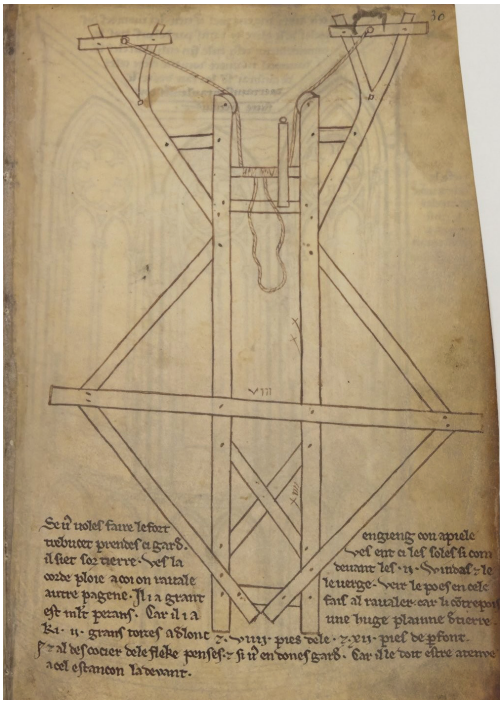

FIGURE 2.7
Portfolio of Villard de Honnecourt, fol. 30r: Trebuchet (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

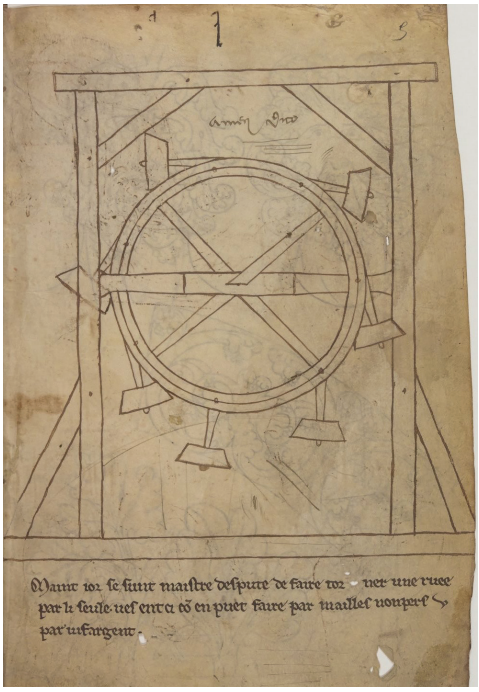

FIGURE 2.8
Portfolio of Villard de Honnecourt, fol. 5r: Perpetual Motion Wheel (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

an architect or a stoneworker because so many of his drawings concern portions of cathedrals or their stone statuary, but there had originally been a lot of drawings related to *engiens de carpentrie* as well. Although we cannot examine the contents of the lost chapter, the knowledge that it was once there should be factored into our assessment of the manuscript and its author. Imagine the direction that Villard scholarship might have taken had there been a few more surviving leaves of carpentry instructions in the Portfolio.

We may further note that, despite the specific loss of the carpentry section, there is still a sizable number of carpentry constructions in the manuscript. No two students of Villard's Portfolio have agreed upon the number of individual drawings it contains, or their proper categorization; but if we eliminate all drawings of a figural or purely artistic nature, including curiosities "drawn from life" (*al vif*), along with the chapter on portraiture which could apply to any medium, and the chapter on masonry which is not by Villard, then we are left with images which Villard drew which are structures or objects made of wood, stone, or metal. A few drawings are still tough calls. The four Reims piers at the top of 32r are counted with masonry, but the 16 small profiles below it are drawings of the templates (*formes*) of the moldings, as much as they are of the moldings themselves. Since these images could be classified either way, we shall leave them out of the count. Also, the Green Men, leaf patterns and crouching dragon could be rendered just as easily in stone or wood, so they too will be left out, although the choir stalls must be counted as wooden structures. After eliminating all the images that could hold a dual allegiance to masonry and carpentry, we are left with 44 remaining items that are the products of one of the technical crafts: 21 belong clearly to masonry, 19 are wooden structures, and four objects were clearly or likely made of metal.[26] Thus, we find that the occurrence of carpentry constructions in Villard's collection is not at all negligible, on a par with masonry drawings—and this despite the pillaging of most of the section on carpentry. The losses to the manuscript make any pretense to statistical reliability in this exercise absurd, and every reader of this argument will likely configure their own variant

26 Which breaks down as follows: [carpentry] perpetual motion wheel, clocktower, three trusses, lathe-turned wooden lantern, sawmill, clockwork, screw jack, crossbow, simple bird automaton, pier-saw, wheel brace, wall brace, tower support with boards too short, three choir stalls, trebuchet; [masonry] Laon plan, small tabernacle, Laon tower, Reims window, Cistercian plan, Cambrai plan, Meaux plan, synthetic plan, masonry joint, Chartres rose, Lausanne rose, Vaucelles plan, Reims interior elevation, Reims exterior elevation, two Reims nave elevations (interior and exterior), three Reims pier structures, another masonry joint, Reims flying buttresses; [metalworking] lectern, small crucifixion, hand-warmer, *cantepleure*.

enumeration of items; but this estimate is adequate to show that the assumption that Villard's Portfolio is primarily concerned with the work of Gothic masons is unfounded. Broadly speaking, the Portfolio of Villard de Honnecourt, despite specific losses to the sections on carpentry, is still as much about working wood as it is about working stone.

2.2 *Villard's Limitations as Architectural Draftsman and Additions of "Master 11"*

The advanced masonry techniques of folio 20 are not by Villard, but added by a second hand, known since Hahnloser's study as "Master 11" (Figure 2.2). This point is often overlooked in general studies which treat Gothic architecture, thereby perpetuating the popular notion that Villard was an architect or mason; but serious students of the Villard manuscript know that these oft-reproduced images were drawn by another hand replacing earlier images of Villard's that had been scraped off. Without these pages in Villard's personal repertoire, any claim that he was a mason falls back on his architectural drawings, elevations, and ground plans. Villard provides an abundance of such drawings, but they differ from the actual structures so much that they can hardly have been the work of a mason who understood how to build them. Furthermore, there is no evidence in his elevations that Villard used the mason's geometrical methods to determine the proper dimensions with any precision, although he seems to have had a general awareness of them, perhaps told to him by workshop masons, as Bork has suggested. Villard did understand many geometrical concepts from the builders' trade, such as the application of *ad quadrature* proportional schemes to various graphic arts and architectural designs,[27] but his architectural elevations do not show anything near the precision necessary to guide construction. We have only a few surviving architectural plans from other sources with which to make a comparison, but it is immediately apparent that Villard's drawings of towers and elevations look nothing like those we know to have been used for design or construction.[28] Only Master 11 exhibits proficiency in the application of

27 Setting aside the question of the authorship of the masonry instructions on 20r where both approaches to doubling the square, or *ad quadrature*, are explained, Villard shows an easy familiarity with this standard geometrical design principle in other drawings unarguably his own: Laon Tower Plan (9v), Lausanne Rose Window (16r), and The Four Pinwheel Masons (19v) (where it currently faces the masonic uses by Master 11).

28 See, for example, Strasbourg, Plan A, *c.*1255 and the analysis of its geometry by Robert Bork in *AVISTA Forum Journal* 16 (2006): 14–22. A comparison of this plan with Villard's drawing of the Laon tower, for example, show them to belong to very different species of image. In his full analysis of the architectural drawings in the Portfolio, Bork repeatedly

geometry to masonry, which is presumably why he decided to redraw these pages. We know even less about Master 11 (or for Barnes, "Hand 4") than we do Villard—another mystery of the manuscript—but his significance is clear: if Villard were any sort of skilled mason, he would not have needed Master 11's additions. Couple this awareness with the evidence cited above concerning Villard's greeting and the missing chapter on carpentry which it promises: to put it plainly, if Master 11 was the specialist in masonry, then Villard, by default, must have been the specialist in carpentry and the author of the rest of the book's contents. The Portfolio was not a collaborative effort—Master 11 added his knowledge to a collection that was otherwise the work of Villard, the only author named in the manuscript. Thus, Villard was an artist, and a carpenter, but not a mason.

2.3 *Precision of Surviving Carpentry Renderings* (*Notched Lap-Joints*)

Villard's drawings of things rendered in wood are far more precise and professional than his drawings of things rendered in stone. In the age before reliable iron nails were available for construction, medieval carpenters joined wooden components with carefully crafted wooden joints that were locked in place with pegs—perfectly fitted connections which enabled the wooden members of load-bearing structures to function as a single, rigid construct. Villard consistently renders the placement of these wooden pegs, denoting them by dots, in his drawings of carpentry constructions, such as the trebuchet of 30r (Figure 2.7); and he is one of the few medieval draftsmen to clearly render the notched lap-joints by which wooden structures were joined (Figure 2.9). The two trusses at the top of 17v, as well as the wheel bracing on 23r, illustrate the standard joint used by Gothic carpenters, easily recognizable from its profile (Figures 2.6 and 2.10). Even the collapsing building at the bottom of 23r, which is only a context to demonstrate a wall brace, includes the broken lap joint which has come free of the wall. It seems to be an ingrained habit for Villard to render the critical connections of carpentry constructions—a precision he does not show in his masonry drawings. Some drawings show mortising which meets flush, probably indicating scarf-joints which would show no visible profile once fastened; but note that Villard never fails to indicate the placement of peg fasteners in any of his wooden constructions which require them (compare 5r, 17v, 22v, 23r, 30r)—including

finds that Villard must have had access to architectural plans, understood at least some of the geometry involved, and that his renderings have "more geometrical coherence than has usually been supposed," even if they are sometimes "sloppily drawn." Bork, *Geometry of Creation*, 31–42.

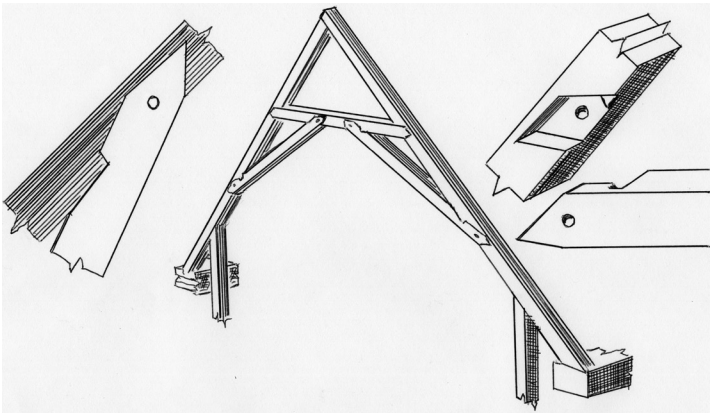

FIGURE 2.9 Profile and Components of Notched Lap-Joints in Roof Truss of Romsey Abbey, Hampshire (after Cecil Hewett, *English Cathedral and Monastic Carpentry* (1985), 24)
REDRAWN BY AUTHOR

the "perpetual motion wheel" of 5r which, although obviously unworkable, is nevertheless conceived as a well-built carpentry construction, with stabilizing braces securely scarfed and pegged (Figure 2.8). The wheel also shows the pegs which hold the mallets in place, and its axle thickens in the middle where the spokes attach, strengthening this critical connection. Villard's consistent habit of clarifying carpentry joints has no parallel among the other technical skills—masonry and metalwork—that have been proposed as Villard's primary occupation. In fact, Villard's renderings of carpentry joints are the most precise medieval drawings of their kind. To imagine that Villard was a mason who drew masonry inaccurately but was especially precise when rendering carpentry is illogical.

2.4 *Villard's Currency with Carpentry Techniques*

From the surviving pages concerning carpentry, it is evident that Villard de Honnecourt was knowledgeable of current carpentry techniques. The single folio page of roof trusses (Figure 2.6) shows designs similar to early 13th-century wooden roofs, which in England have been extensively studied and rendered by Cecil Hewett. The first system is a standard truss, consisting of a central king-post supported by a collar-beam, which rests at each end upon queen-posts that carry the load to the sole pieces. Villard indicates notched lap-joints tying the collar to the rafters, with the king-post mortised into its center point and at the apex. The queen-posts are apparently scarf-jointed top and bottom, as we are shown no profile of the joint, although the peg points

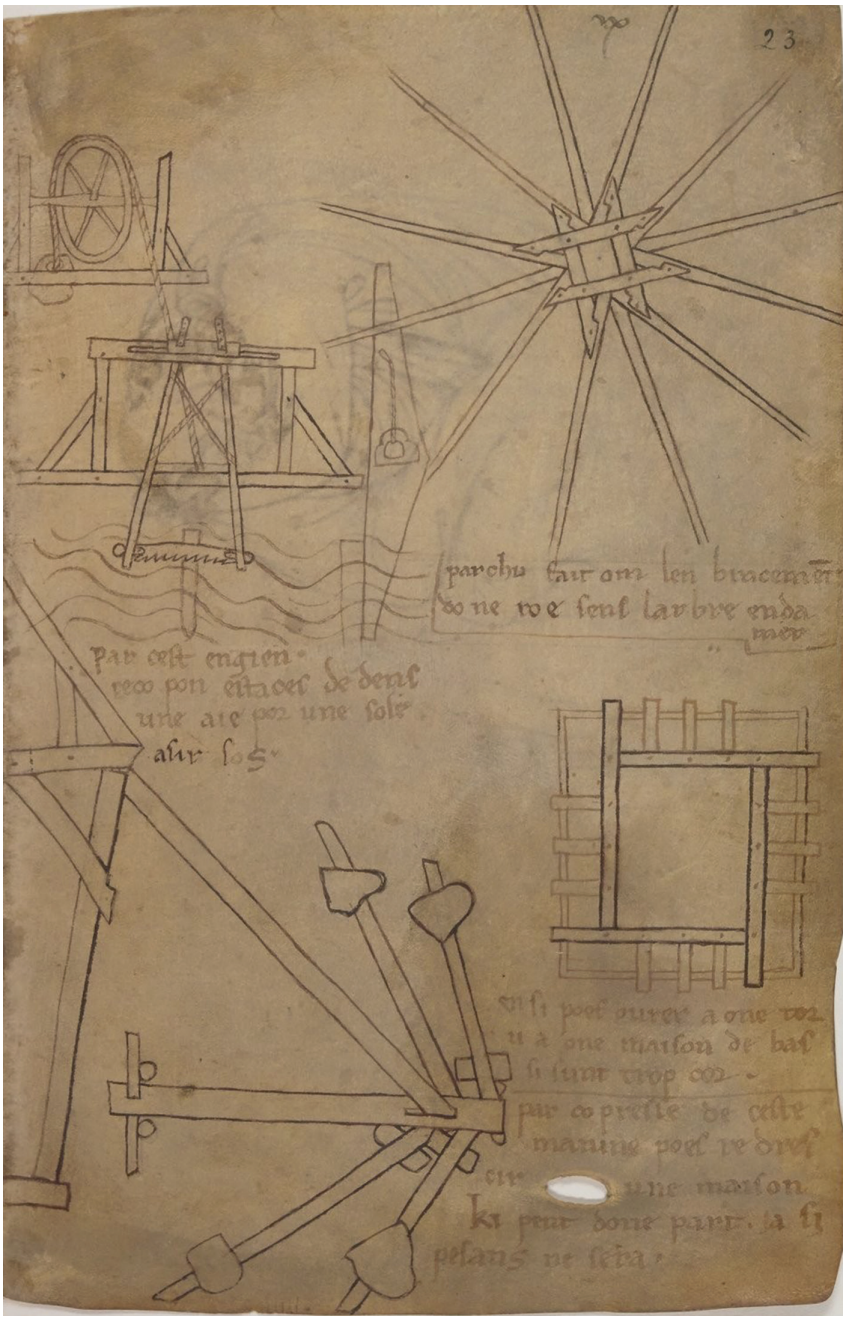
23
parchu faur om len bracenn
so ne voe sent lavbre enda
Par cest engien
reco pon etaoer de dent
une aie por une sole
asiz sos
en si poet ourer a one voz
u a one maison de bas
si iunt trop coz
par co prelle de celle
manire poet re drec
une maison
ki pur sone pare. la si
pesans ne sera

FIGURE 2.10 Portfolio of Villard de Honnecourt, fol. 23r: Advanced Carpentry Instructions (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

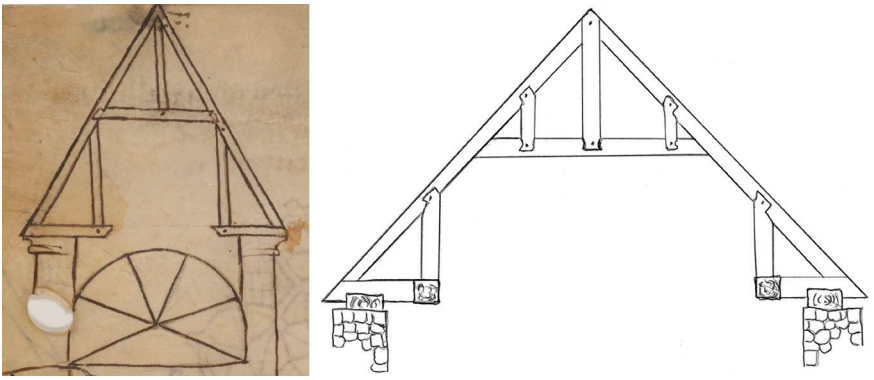

FIGURE 2.11 [left] Portfolio of Villard de Honnecourt, fol. 17v, detail: Truss (Photo: Paris, Bibliothèque nationale de France); [right] Truss, Saint Vincent of Soignies, *c.*1170 (Robert Mark, ed., *Architectural Technology up to the Scientific Revolution*, 1993; ch. 5: "Timber Roofs and Spires," L.T. Courtenay, 213, fig. 5.23)
REDRAWN BY AUTHOR

are depicted. Villard indicates that this truss is designed to fit over a vaulted ceiling, sketched underneath in the drawing.[29] This trussing would not have been visible once completed, as is true of the "strong side aisle" figured beneath it. It is unlikely that these were curiosities that Villard recorded, but standard carpentry techniques known to professional builders. The late 12th-century trusswork framing the choir of St. Vincent of Soignies is a relative of Villard's first design (Figure 2.11);[30] and English cathedral carpentry of the 13th century exhibits designs similar to Villard's other two trusses. The side aisle trussing is unusual in its triple row of ashlar pieces forming the footing, indicating the carpenter's concern with reinforcing this most likely area of sagging. A similar contemporary specimen is found in the side aisle roof of Salisbury Cathedral; and the triple brace system is seen about a century later in the aisle roof of Cartmel priory in Lancashire (Figure 2.12). Villard's third truss is a more daring design, employing arched scissor-braces and eliminating the usual collar beam that would have reinforced the truss at the crossing point of the S-shaped braces. There is nothing similar among surviving examples of this elegant, curved truss until over a century later, where something akin to it is found in the western part of Greyfriars, Lincoln.[31] Architectural histo-

29 Bucher, *Architector*, 108. He also reports that a similar roof is to be found above the nave at Pontigny.

30 R. Mark, *Architectural Technology up to the Scientific Revolution* (1993), 213.

31 Louis Salzman, *Building in England Down to 1540* (1952), argues that Villard's trusses and hammerbeams are theoretical constructions because no examples are known until a

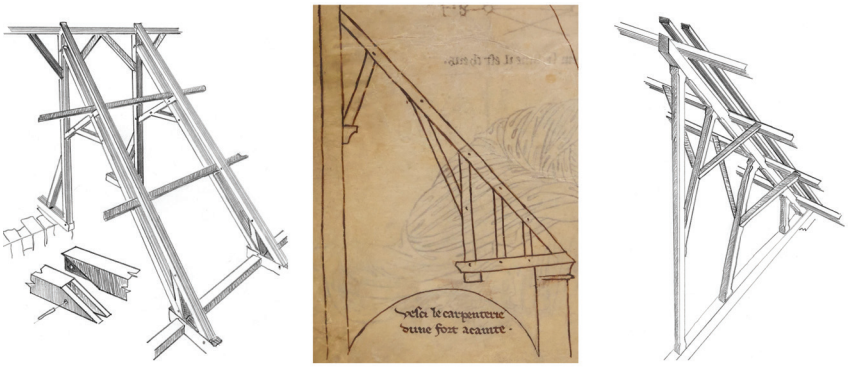

FIGURE 2.12 [left] Side Aisle Roofing of Salisbury Cathedral, *c.*1230 (Hewett, *Carpentry*, 86, fig. 82), Redrawn by author; [center] Portfolio of Villard de Honnecourt, fol. 17v, detail: "Strong Side Aisle Truss," *c.*1230 (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF; [RIGHT] SIDE AISLE TRUSS OF CARTMEL PRIORY, LANCASHIRE, *C.*1340 (HEWETT, *CARPENTRY*, 91, FIG. 87), REDRAWN BY AUTHOR

rians have noted that Villard's taste in architecture is slightly old-fashioned, and that the masonry subjects he depicts are not in the vanguard of his time, but merely unusual subjects or solutions to odd problems. In contrast to this, Villard's fragment of roof carpentry happens to concern techniques which are in advance of known contemporary examples. Even allowing for the imprecise nature of the survival of historical evidence, we can still place Villard de Honnecourt among the most advanced practitioners of trussing techniques in his day.

Perhaps a more significant demonstration of Villard's detailed knowledge of new carpentry methods is his rendering of a system for bracing the spokes of a hoisting wheel (23r). Master II added an explanation: "By this means one makes the spokes of a wheel to reduce damage to the axle" (Figure 2.10, upper right). What Villard has drawn, and Master II has described, is one

century later (sic!). Such a claim ignores the obvious problem of the uncertain nature of surviving evidence, which, in the case of wooden structures, must always be considered particularly scanty and scattered in patterns that may have no resemblance to the actual building trends at the time of construction. It is sufficient for our purposes to show that Villard's truss designs are within reach of known 13th-century designs and are in accordance with contemporary techniques. For Villard's curved truss, compare to Hewett, *Carpentry*, figs. 25 and 130—while not as closely matched as the previous examples, these two are within a half century of Villard's period of activity and show similar methods for dealing with stresses which, if combined, would form something very close to Villard's design.

of the singular advances made in the construction of windlasses during the Gothic era. The structural integrity of these wheels was improved during the 13th century by the innovation of bracing methods that did not require the cutting, and consequently the weakening, of the axle. The solution was to construct crane wheels with thicker, squared axles, around which the spokes were snugly fitted and braced. This reinforcement allows the straddling spoke arms to grip and twist the axle in the manner of pliers on a square nut. Villard does not render the rim of the wheel, seeming particularly fascinated with the method of bracing the spokes to the axle. Each brace is notched and lap-jointed at either end to different spokes set perpendicular to one another. Eight of the 12 radial arms are fastened by these braces, with the remaining four spokes abutted to the axle and acting as secondary supports for the rim. This clasp-arm technique developed around the time of Villard's activity, which means he was current with the most advanced construction machinery of his day.[32]

2.5 *Advanced Mechanical Engineering*

The mechanical devices of folios 22v and 23r include some of the most sophisticated engineering concepts known in Villard's time and provide the final argument that the author of the Portfolio was a skilled carpenter (Figure 2.13). Before the development of mechanical clocks, all serious machinery was made of wood, sometimes with metal fittings to protect the surfaces of components subject to heavy wear, friction, or impact. Thus, the building of medieval machinery was a job for carpenters—a fact little explored in most studies of medieval technology. From the more than 50 medieval construction contracts that survive, we find that carpenters were hired to build not only houses, shops, and roofs, but also bridges, watermills, windmills, and fulling-mills.[33] The increasing complexity of these mills encouraged carpenters to think in terms of mechanical engineering, as Villard undeniably does. Siege weapons were also the responsibility of the master carpenter, and Villard provides a diagram for a trebuchet (30r) and its profile, regrettably among the lost folios of the manuscript. The double-action hydraulic saw (22v) is the most advanced machine of its type from the early 13th century: a stout pole provides the return

32 It had long been thought, based on the scatter of surviving windlasses in England, that the clasp-arm technique was an innovation of the 16th- or 17th-century. Hewett counters with this image from the Villard manuscript to show that it was clearly understood in the early 13th century. Hewett, *Carpentry*, 196–97. See also, Mattheis, "Medieval Treadwheels."

33 Julian Munby, "Wood," *English Medieval Industries* (1991), 388 and n. 35.

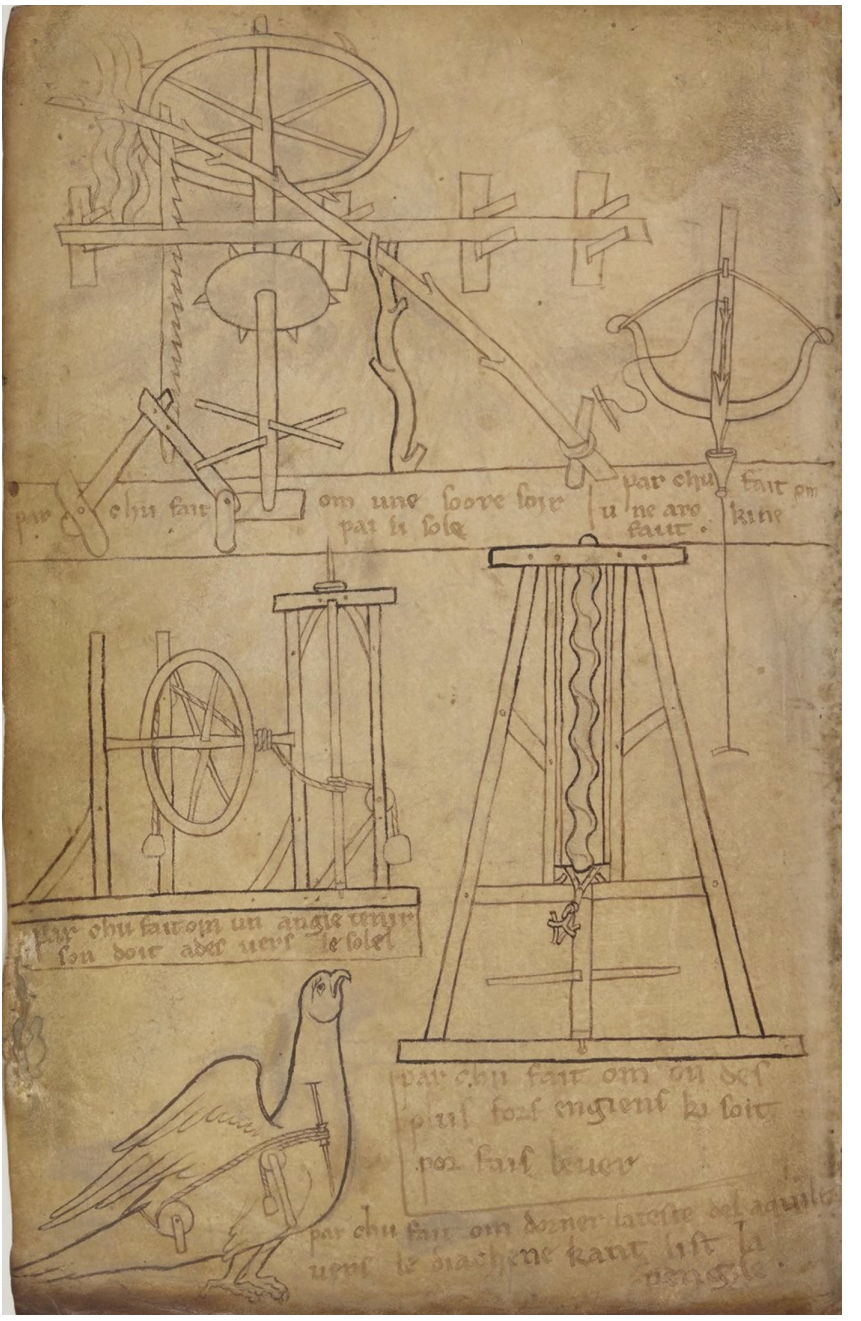

FIGURE 2.13 Portfolio of Villard de Honnecourt, fol. 22v: Advanced Carpentry-Engineering (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

pull on the saw which is pushed by the cams against the saw blade's jointed headpiece; simultaneously, a spiked gear attached to the main drive axle carries the log to the saw. This gear is apparently too large to work effectively since it would speed the timber along faster than the saw could cut it, prompting many historians of technology to reject it as an unrealized concept or failed attempt; but it is likely rendered in the symbolic shorthand that characterizes other parts of Villard's work, and the mechanical concepts involved in his machine are quite sound. Several Villard scholars have ventured reconstructions of his saw which correct the visual difficulties and make comprehensible Villard's seemingly rickety device (Figure 2.14).[34] His other machine drawings include a

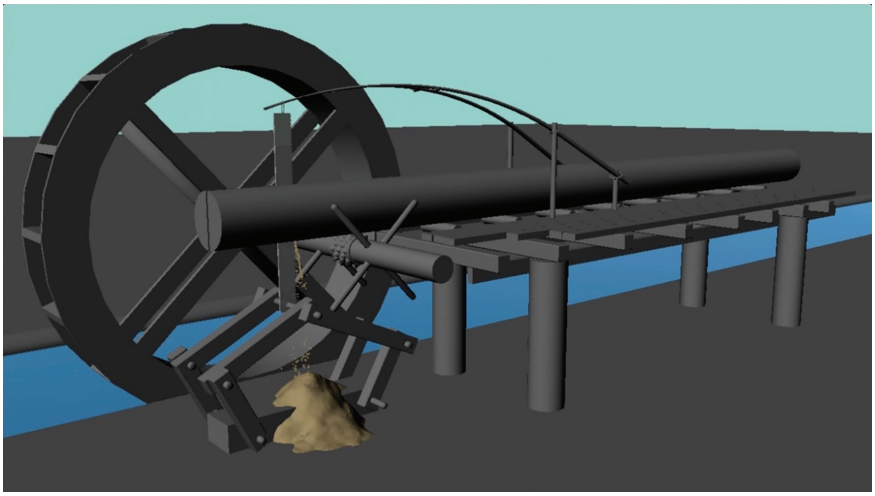

FIGURE 2.14 Reconstruction of Villard's Hydraulic Saw by George Brooks and Buzz Dawson. [Animation housed on AVISTA website]: www.avista.org

34 François Bucher's little-known reconstruction of Villard's sawmill corrected the problem with the overly large, spiked drive wheel by substituting spikes embedded in the axle, but he failed to correct the pre-perspective approach in which Villard drew and presented a bizarre device that made a horizontal cut through the log. Such a device could not work as the upper part of the log would squeeze the kerf and jam the sawblade under the force of gravity. Bucher, *Architector*, 188, fig. 31. Jean-Pierre Adam shrinks the drive wheel some but still leaves it too large—however he does correct the rendering by showing the saw making a vertical cut and providing a tension pole to both sides which would be required to keep the saw moving straight, something that Villard must have considered too obvious to bother drawing; and his rendering of the strange toggle gear that attaches to the bottom of the blade is in keeping with our understanding of early hydraulic saw mechanisms (Reproduced in Barnes, *Fascimile*, 157, fig. 37). This saw presents a sensible hydraulic substitute for the human labor involved in a pit-saw operation. My rendering combines the best features of each of them. For a short animation of this reconstruction of Villard's hydraulic saw, see the AVISTA.org website.

device for sawing off timbers under water so as to set a pier upon them, techniques to brace a sagging wall, and how to work on a tower even if the boards are too short to span the distance (all on 23r). All of this belongs to the professional world of the carpenter. Beneath the advanced sawmill of 22v, we also find an efficient screw jack for lifting heavy loads, which is described as "one of the strongest lifting devices," and above it, a crossbow "that does not miss," illustrating the wide range of wooden items devised by medieval carpenters. Finally, Villard records the state of fine mechanical technology in the "bird-automaton" which a preacher could move by means of a hidden cord, and above it a curious attempt at a mechanical clock (22v). Villard lived at least a half century before the invention of the *verge-&-foliot* escapement mechanism which would allow for a workable gravity-driven timekeeper, but his drawing is clear indication that he was intrigued with the most advanced engineering experiments of his day.[35] The inclusion of his famous "perpetual motion wheel" makes this point irrefutable.

Taken together, these five arguments offer a compelling reconstruction of Villard de Honnecourt as a Gothic builder, but one primarily trained in carpentry. From this apprenticeship, Villard would have made use of his artistic talent and developed the related skills of woodcarving, and with his mechanical aptitude learned the technical expertise associated with machine building, all of which is well represented in the manuscript. However it happened, Villard found himself in the employ of ecclesiastics for most, if not all, of his career, which put him into contact with the masons and architects who were engaged in church construction during the height of the Gothic era. Villard recorded aspects of their work either because it interested him, or—if Barnes is correct in his final essay (reprinted in this volume),[36]—because he was sent to gather ideas for the construction of the cathedral at Cambrai. Villard's comments on the elevations at Reims would certainly seem to suggest this.

The revelation that Villard de Honnecourt was a carpenter resolves several thorny problems which have emerged over the last century of Villard scholarship. Primary among them is the question of why Villard's drawings of architectural elevations diverge from actual appearance. No satisfying answer has yet been offered for his baffling failures at rendering the elevations and buttresses of Reims Cathedral, which not only diverge from appearance, but in ways that

35 E.R. Truitt, in her study *Medieval Robots: Mechanism, Magic, Nature, and Art* (2015), comes to similar conclusions regarding Villard's involvement with and understanding of the state of technological automata of his day, 118–22.

36 Carl F. Barnes Jr., "An Essay on Villard de Honnecourt and Cambrai Cathedral," *AVISTA Forum Journal* 17 (2007): 21–26, reprinted in this volume as chapter 1.

would compromise the integrity of the building; nor why Villard employed limited proportional measurement schemes to draw his elevations, being either unaware of or uninterested in using the geometrical systems which govern the construction of buildings. It would appear that when Villard drew, he usually drew artistically, not technically. But any attempt to reduce him to an artist only, with a dilettante's love of curiosities, provides a weak explanation for the variety of advanced technical drawings. However, we may convincingly argue that Villard possessed the technical skills of a trained carpenter and the sensibilities of a practiced artist, with a general awareness of geometrical schemes that he picked up in conversations with the masons he worked with. So, when he drew architectural profiles, they represent Villard the artist recording a beautiful work, only loosely based on geometrical proportions, for which Villard the carpenter may have built wooden supports, not a mason describing the principles of their construction. It has been argued by Barnes and others[37] that perhaps Villard was not a builder at all, but merely a clerk or some lay representative of the Cambrai chapter sent out to gather ideas for their planned cathedral. This would make sense of Villard's comments linking the elevation at Reims to those of Cambrai, "if one makes them correctly"—but why would the chapter send a mere clerk (or a bad mason) on the important task of gathering architectural and engineering information, and why would that clerk deign to proffer such specific technical advice, and render all the other technical subjects that are completely unrelated to the Cambrai project? And how is it that this "book" was produced out of the leftover material of a gathering mission? However, it does make a great deal of sense that the chapter would send someone with wide-ranging technical qualifications to gather the best ideas, examples, and techniques for their planned cathedral, someone who could evaluate both artistic and engineering matters and communicate them with engaging visual examples, and a carpenter-artist-engineer—sometimes called an *ingeniator* in medieval documents—is just such a person. The gathering mission for the Cambrai Chapter was thus just one assignment in Villard's career—echoes of which remain in his notes—but it was not the purpose of the "book" he composed.

Still, it must be admitted that there is a lot of material in the Portfolio, in Villard's hand, that does directly concern the work of masons. But Villard's particular choice of subjects may be explained as topics of masonry concerning the carpenter. It took the talents of both masons and carpenters to build a great church, and they interacted closely on the construction site: masons built walls

37 Starting with Branner's "clerk with a flair for drawing" comment and culminating in Barnes's final essay on Villard and Cambrai Cathedral (see n. 36 above).

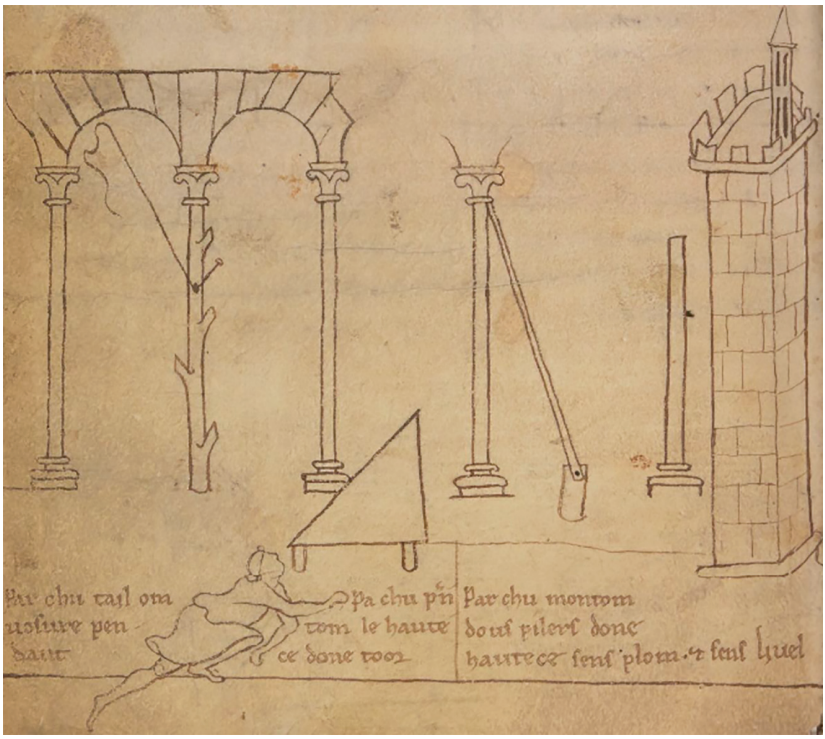

FIGURE 2.15 Portfolio of Villard de Honnecourt, fol. 20v, detail: Constructional Engineering (Paris, Bibliothèque nationale de France, MS fr. 19093) REPRODUCED BY PERMISSION OF THE BNF

and carpenters erected roofs over them, carpenters built the scaffolding and hoisting machines by which masons moved stones into place, carpenters cut wooden templates and masons used them to guide the carving of stone profiles. At the bottom of the second leaf of masonry instructions, one sees this interaction: wooden devices are employed in the bracing and sizing of unfinished piers and arches, while another figure drawn by Villard uses the ancient triangle method to gauge the height of the tower on the right edge (Figure 2.15). The professional lives of masons and carpenters were conducted in such frequent concert that the masters among them must certainly have discussed common engineering concerns. "Such a conversation is glimpsed in" Villard's comment on his *perpetuum mobile*, telling his readers that "Masters have often debated among themselves how to make a wheel turn by itself" (5r). Villard's professional interest in such things as carpentry joining led to curiosity about such things as masonry joints (15v and 32r), which are among Villard's more careful masonry drawings (Figure 2.16). The attention to details of moldings is of natural interest to carpenters who cut the templates for them (Figure 2.17). And a sensitive artist/

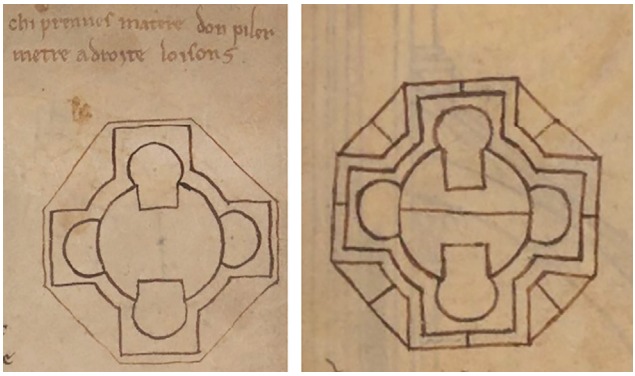

FIGURE 2.16 Portfolio of Villard de Honnecourt, details of folios 15v & 32r: Masonry Joints (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

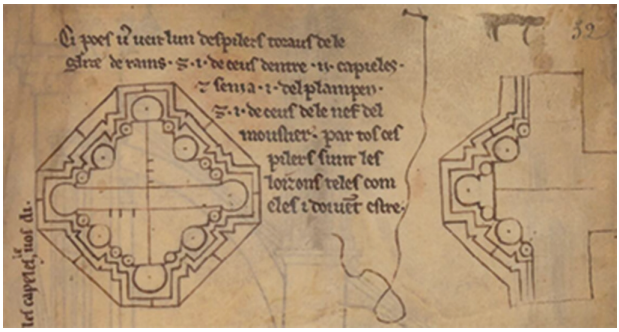

FIGURE 2.17 Portfolio of Villard de Honnecourt, fol. 32r, detail: Reims Pier Templates (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

builder requires no justification for having sketched the distinctive features of the most daring architectural monuments of a great age. It does not matter that he altered and dangerously slenderized the design as nobody would be using it as a guide to construction. It is far more plausible that Villard as a carpenter-engineer would draw the masonry images he does, than for any type of mason to render roof trusses with notched and pegged lap-joints and possess knowledge of such a variety of machinery. Neither can we explain why a mason who aspired to leave an instructional manual to posterity would draw architectural elevations poorly and require Master II to complete the technical lessons. And no one other than a skilled carpenter has any business rendering a device as dangerous as a trebuchet—both a plan which survives and an elevation which has been

lost—along with guidance on how to construct it. The other random curiosities unrelated to cathedral construction are plausible for any sort of artist-builder to have recorded, but it strains credulity to imagine anyone other than a carpenter recording construction details of a siege weapon were he not qualified to build it. Given the array of drawings in the Portfolio, coupled with a consideration of the specific choices and the various levels of technical precision, displayed, Villard de Honnecourt is most logically reconstructed as a skilled carpenter, accomplished artist, and mechanical engineer: a medieval *ingeniator*.

Our understanding of the carpenter's craft in the High Middle Ages is deepened by the recognition that the Portfolio is a fragment from the personal notes of a Gothic carpenter. We may now consider anew the technical drawings in the Villard manuscript, confident that their author understood what he was rendering. Architectural historians may now find renewed interest in the Villard manuscript as a window into their subject from the point of view of the carpenters who worked alongside the masons and architects. We also have cause for renewed frustration when we realize that the missing chapter on carpentry was surely the author's best technical material, revealing the specifics of a craft for which we would like to know much more. It is likely that this chapter contained detailed drawings of various carpentry joints, since Villard also rendered interesting masonry joints he came across. A carpenter involved with cathedral construction certainly had plans and drawings of windlass hoists, for which the spoke brace on 23r was a technical advancement developed in Villard's era. Who knows what other *engiens de carpentrie* were known to Villard and lost to posterity with the disappearance of most of the fifth quire? What remains of Villard's professional, technical drawings are mostly the specialized and tangential topics, along with his purely artistic production, plus the contributions of Master II. Scholars have spent a century and a half trying in vain to assemble these peripheral scraps into a sensible whole concerning architecture and masonry, beguiled by the accidents of history. The really useful stuff, the core of the chapter on carpentry, was borrowed long ago and not returned. Ironically, we may see in the loss of this material a final argument that the most advanced skills possessed by Villard de Honnecourt, and the most useful component of the Portfolio in its original form, was carpentry.

3 Addendum: The "Schlink-Wirth Thesis"

In the interval between the original publication of this essay and this revised reprint, a new argument has been lobbed at the now entrenched notion that Villard de Honnecourt could not have been an architect or master mason.

Jean Wirth published his own analysis of the Villard manuscript in 2015 that takes Barnes and his facsimile to task for not fully considering the insights of Wilhelm Schlink who, in 1999, questioned whether Villard was himself illiterate and suggested that while most of the images were by Villard, perhaps all of the writing was added by professional scribes to whom Villard dictated: how else does one explain that Villard spells his name differently in different parts of the manuscript? Schlink concluded that Villard was illiterate and resorted to several scribes to add the commentary to his lifetime of images. Wirth looks at this evidence and draws the equally plausible conclusion that Villard was the author of the nonprofessional looking script that has usually been attributed to "Master II" and that the preponderance of writing usually ascribed to Villard, as well as that of Master III, was done by professional scribes employed by Villard for the purpose. Wirth and Schlink both argue that the entire manuscript presents the skills and thoughts of Villard de Honnecourt—there are no "continuators." This is an extremely important insight that, while radical at first hearing, cannot be easily dismissed. Branner and Barnes spent decades dismantling the entrenched notion that Villard was an architect, with one critical argument rooted in the observation of Schneegans in 1901 that there were two other hands in the manuscript beyond the one that was presumably Villard's. And since the difficult masonry techniques of folio 20 were ascribed to a different hand (Master III for Schneegans, Master II since Hahnloser, Hand IV for Barnes), then how could Villard be credited with masonry skills? But what even these skeptical and critical commentators failed to consider is that multiple *hands* in the manuscript does not necessarily mean multiple *authors*—it was common practice in the medieval era to dictate to a professional scribe (even learned scholars like St. Thomas Aquinas are known to have employed scribes, Wirth reminds us) so why not Villard? And so, the "Schlink-Wirth thesis" posits that Villard is indeed the singular author of MS Fr 19093, and that he employed several successive scribes to add instructions and commentary to his *portfolio* of drawings as he transformed it into a *book* for the instruction of future artist-builders. Where Wirth breaks with Schlink is in ascribing to Villard personally all the inscriptions normally assigned to Master II, which includes the folio of difficult masonry techniques, thereby inverting the Branner-Barnes estimation of Villard. Villard de Honnecourt *is* Master II, whose writing is sloppier than that of the other two professional scribes, and more lightly inked as if it were meant to be erased later. It also returns to Villard knowledge of Latin and the possibility of him being more formally educated: folio 18r, which begins the "chapter" of *portraiture as instructed by geometry*, is introduced in Picard French and repeated in Latin by the same hand. Wirth argues that when it came time to put his lifetime of collected knowledge into an instructional

manual, he dictated the extensive explanations to professional scribes with much nicer handwriting than he. For whatever reason, the pale script of Master II (his own) was never effaced and replaced with professional script.

The strength of this argument lies in the recognition that while Masters I and III have the uniform, elegant handwriting of professional scribes, Master II does *not* have that appearance. So, what is it doing there unless it represents the original commentary made by the manuscript's only named author? It further resolves an annoying problem that has never been adequately answered: why does Master II so often make what have been called "superfluous" comments and faulty identifications? If Master II came after Villard, his comments often make no sense and sometimes make an incorrect attribution that has already been correctly identified; but if Master II is Villard and his inscriptions are the first ones in the manuscript, then it makes perfect sense for later hired scribes to have had dictated to them a full explanation to add to what was usually just a brief identification, or flesh out an explanation, and to correct the occasional misattribution. This much of the argument is nearly irresistible. But from this observation, Wirth extends his thesis to the resurrection of Villard's reputation as an architect: the masonry instructions on folio 20 are accompanied by this script which was added at the same time as the redrawn pictures—images and texts form one coherent program—thus, those masonry techniques are also by Villard. The argument has long been that Master II erased and redrew these images because they were somehow flawed, either at the time the manuscript was being prepared for binding or soon after it left Villard's hands. Because the writing was assumed to belong to someone other than Villard, the images must also reflect the knowledge of someone more skilled in masonry techniques. Wirth counters that these images were scraped and redrawn because Villard realized that he had not left sufficient room for the explanatory inscriptions, and so started over, redrawing and newly inscribing them in one sitting. It all comes down to how assuredly we can identify, or rule out the identity, of the hand that left most of the images and inscriptions on folio 20.

Barnes spent weeks in the Bibliothèque nationale in Paris examining the original manuscript, bringing to bear a lifetime of study of medieval scribal and artistic techniques, and concluded by the thinness of the lines and the different nibs and inking habits that these pages were not by any of the first three masters of the manuscript, but by a hitherto unrecognized contributor he dubbed "Hand IV"—Barnes thus breaks with all prior students of the Villard manuscript in positing a novel hand in the Portfolio. This revelation, if correct, leaves intact the estimation of Branner and Barnes, who posit to someone other than Villard the masonry skills reflected in folio 20. Wirth, however,

insists upon these images belonging to Villard: the thinner lines and tighter script being the natural result of needing to squeeze as much as possible onto the expensive and already scraped parchment—that the author needed to resort to a palimpsest makes the need for economy self-evident. The lettering certainly looks similar, only a bit tighter and cleaner. One might add that perhaps when Villard sat down to put his career portfolio into book form, he treated himself to a new quill. If we admit the thesis that multiple styles of handwriting might only mean multiple scribes, not authors; then we can just as easily accept that similar handwriting with different nibs also might not indicate different hands, just different pens.

It is also true, as Barnes and others have pointed out, that the redrawn figures were done after the binding, as indicated by the gutters which show bits of the earlier version of this page, and this is often taken to show that Master II came later and made the improvements after it left Villard's hands. But we can also easily imagine that Villard had finished his work, and then came across a builder's guide with an organized page of handy techniques, maybe better thought out than his own, and so scraped and improved his own book by copying it carefully. Barnes reminds us that the page was surely copied from an exemplar, called "The Archetype" by Branner, as evinced in certain details of the language, and especially the curious lack of the *p* in *'par chu'* in every initial line except the first: the original must have had a large initial letter *P* that was understood to begin each line.[38] But the copying from another text only shows that the possessor of the manuscript came upon it after the Villard Portfolio had been bound—without firm attribution of scripts, it could just as easily have been Villard himself who did this, and perhaps that makes more sense than imagining a later user of the manuscript deciding to do so. Whatever else one accepts of Wirth's argument, there is no denying that it does force students of the Villard manuscript to think about the artifact afresh.

We cannot here settle the question of whether the masonry techniques of folio 20 are those of the same Master II as appears elsewhere in the manuscript, or if they belong to Barnes's Hand IV. Barnes urged a chemical analysis of the inks used in the inscriptions in the Portfolio,[39] but any results from that no longer seem decisive: the inks as well as the nibs used during his travels do not have to match those he used at the end of his career when he was arranging and supplementing his materials to make a book of them. On this point, we are left to decide for ourselves if the script that is unquestionably Master II is the same or not as Hand IV (Figure 2.18).

38 See Barnes, *Portfolio*, 138 for a diagram illustrating how this page might have looked.

39 Barnes, *Villard*, 13, n. 65.

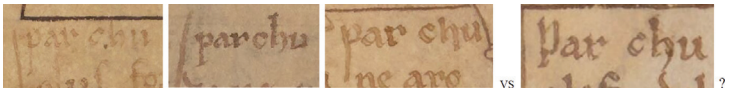

FIGURE 2.18 *"Par chu"* ~ Three examples of the hand of "Master 2" writing 'par chu' (folios 22v and 23r [advanced carpentry devices]), compared to the same phrase on 20v [masonry instructions] : is it the same Villard/Master 2 or Barnes' "Hand 4"? (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

What can be dismissed is the notion that any of this proves that Villard de Honnecourt was an architect in any sense of the word. We should note that the word "architect" could mean different things to the medieval user of the term, designating the patron of a church as well as the builder, who might have held the title of master mason. But Wirth means it in the sense of someone who understood how to design and direct the construction of a great church, and no matter how clever the philological argument is, there is no getting around the flaws in the architectural renderings, or the fact that they just don't look like any of the drawings (admittedly from a later medieval period) that we know were drawn by actual masters in charge of erecting a great church. As we have already noted in our summary of the Villard question, these drawings could not have served as the basis of construction. To take just one example of the difficulty in seeing an architect behind the Portfolio: in the drawings of Reims, the elevations of which differ in multiple ways from the actual structure, and the flying buttresses which, if built as drawn, would surely collapse due to their being too slender, improperly proportioned, and featuring wide openings that would weaken them irresponsibly, Wirth must resort to special pleading to maintain Villard's credentials: perhaps he was only rendering the main features and not every detail, or perhaps he was working from earlier plans that were later changed; it could be that the blackened areas of the buttresses do not represent openings but shallow recesses, or perhaps these are not actually the buttresses of Reims but those of another project…[40] Ultimately, most any shortcoming in the architectural drawings is explained as an instance of Villard exposing the principle without worrying about the details.[41] Well, an architect is supposed to be worried about the details! Wirth is essentially arguing that Villard was an architect who carried around a collection of not-really-architectural drawings. Why? Who was he drawing these

40 It is true that they are nowhere labeled as such but are simply collected amidst several folios that show details of Reims—but still, it is not a structurally sound design.

41 "Il s'agit au plus d'en exposer le principe sans se soucier des détails …" Wirth, *Villard*, 237.

for, and for what reason? If, as Barnes believed and I tend to agree, Villard was sent on a gathering mission for good ideas he could show the planners of Cambrai Cathedral, then he must have been, as I have argued, a multiskilled *ingeniator* who would have been knowledgeable enough to sort through a lot of ideas and select the best ones to bring back to the planning table, at which point an architect or master mason would have been hired to do the actual drawings and design the templates upon which construction would be based. If Villard were himself that architect, would he not have at least one drawing in his entire surviving Portfolio that looked like a useful builder's plan? But no: all the architectural depictions—the rose windows that he altered a bit or a lot, the elevations that are flawed and oddly narrowed, the flying buttresses that show a handsome *general idea* but could not stand as drawn—these are the renderings of someone with artistic skill and some knowledge of their geometrical schemes, but not one of them is suitable for actual construction. They are, however, lovely images rich with ideas that ecclesiastical patrons could get excited over as they planned their cathedral. We may see in the *portfolio* the work of a man involved in architectural projects, even one who understood a good deal of the technical aspects and geometry involved in building; but his architectural drawings could serve only for client presentation—we cannot make of him a practicing architect based on what we have.

In the end, the aspects of the "Schlink-Wirth" thesis that are most compelling—the elimination of the necessity of as many authors as hands in the manuscript, and the identification of Villard de Honnecourt with the personal script that has long been known as that of Master II—provides an unexpected additional support for the carpenter-thesis of this essay. Setting aside the Master II/Hand IV debate of folios 20r, 20v, and 21r, where do we find Master II's handwriting in the Portfolio? This script identifies several choir plans (15r and 17r), and both rose windows (15v and 16r), as well as the brief introduction in Latin and Picard French for the chapter on portraiture. Beyond that, the preponderance of Master II's inscriptions accompany carpentry drawings: all the clever devices of advanced carpentry and machine-building on 22v and 23r, and the wooden clocktower of 6v. We have noted that a carpenter's interest in joinery would easily lend itself to an interest in how masons do similar things, and we see the same script accompanying the pier joint that shares 15v with the Hungarian tiles and the Chartres rose, declaring: *here is an example of a pier with correct joints.* Again, if Villard had been sent on an idea-gathering mission, it would make perfect sense for him to identify the choir plans and rose windows, both of which must have been copied from other plans, at the time he drew them so as not to forget what he had copied. With most of the other subject matter, he was content to dictate to scribes who would

put the results of his mission and his summative thoughts into elegant script. But the advanced carpentry machines—and the ones we have are only the remnants of what had been an entire chapter on carpentry—these must constitute Villard's area of professional expertise and for some reason the same casual script was employed here rather than that of one of his fancy scribes (Figures 2.10 and 2.13). This is the only place in the manuscript, other than the debatable masonry drawings, that have this script extensively integrated into a multipage spread of technical drawings—and it is not the handwriting of a scribe who made his living by elegant penmanship. What other reason accounts for the presence of the Master II script on specialized machines that are surely from Villard's hand, if not that it is, in fact, his own? Ultimately, Wirth's argument can only strengthen the identification of Villard with carpentry, and if Hand 4 should ever be shown irrefutably to be only the designation of a new pen wielded by Villard, thus fully collapsing Hahnloser's Master II script into that of the Portfolio's author, then we can expand his technical knowledge further into the realm of masonic geometry and stereometry, which would not be at all surprising to this author. We cannot return to Villard his early status as architect, and the question of his knowledge of masonry remains unresolved, but the rest of the Schlink-Wirth argument is congruent with this thesis that places Villard de Honnecourt firmly in the ranks of the *ingeniators* of the Gothic era.

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CHAPTER 3

The Counterweight Trebuchet, the History of Its Name in Medieval France and Britain, and the Terminology of Its Components in Villard de Honnecourt

William Sayers

It is now generally agreed that traction and counterweight trebuchets were developed in China centuries before the Christian Era, and reached the Middle East and Central Europe through such intermediaries as the Mongols, Arabs, Avars, and their Slav armies.[1] Our most extensive description is found in Yusuf ibn Arunbughâ al-Zaradkâsh's *An Elegant Book of the Trebuchet* (*al-Aniq fiq*

1 The present study incorporates and updates material earlier published as William Sayers, "Villard de Honnecourt on the Counterweight Trebuchet," *AVISTA Forum Journal* 19, nos. 1–2 (2009): 46–48, and "The Name of the Siege Engine *Trebuchet*: Origin and History in France and Britain," *Journal of Medieval Military History* 8 (2010): 189–96. My thanks to Boydell and Brewer for their permission to rework portions of the latter. Essential studies and accounts of construction and experimentation with trebuchets include the following: Roland Bechman, *Villard de Honnecourt: la pensée technique au XIIIe siècle et sa communication* (Paris, 1991); Paul E. Chevedden, "Fortifications and the Development of Defensive Planning during the Crusader Period," in *The Circle of War in the Middle Ages: Essays on Medieval Military and Naval History*, ed. Donald J. Kagay and L.J. Andrew Villalon (Woodbridge, 1999), 33–43, and "Black Camels and Blazing Bolts: The Bolt-Projecting Trebuchet in the Mamluk Army," *Mamluk Studies Review* 8 (2004): 227–77; Paul E. Chevedden, Les Eigenbrod, Vernard Foley, and Werner Soedel, "The Trebuchet," *The Scientific American* 273 (1995): 58–63; P.V. Hansen, "Experimental Reconstruction of the Medieval Trebuchet," *Acta Archaeologica* 63 (1962): 189–208; D.R. Hills, "Trebuchets," in *Medieval Warfare 1000–1300*, ed. John France, The International Library of Essays on Military History (Aldershot, 2006), 271–88, reprinted from *Viator* 4 (1973): 99–114; Michael Kirchschlager and Thomas Stolle, "Das teuflische Werkzeug: Entstehung und Geschichte der Weissenseer Steinschleuder," in "*Warfen hin und in steine / grôze und niht kleine …*"*: Belagerungen und Belagerungsanlagen im Mittelalter*, ed. Olaf Wagener and Heiko Lass, Beihefte zur Mediaevistik: Monographien, Editionen, Sammelbände 7 (Frankfurt am Main, 2006), 27–46; Tanel Saimre, "Trebuchet – A Gravity-Operated Siege Engine," *Eesti Archaeoloogia Ajakiri: Journal of Estonian Archaeology* 10 (2006): 61–80; and W.T.S. Tarver, "The Traction Trebuchet: The Reconstruction of an Early Medieval Siege Engine," *Technology and Culture: The International Quarterly of the Society for the History of Technology* 36 (1995): 136–39. Particularly pertinent to the present study are David S. Bachrach, "English Artillery 1189–1307: The Implications of Terminology," *English Historical Review* 12 (2006): 1408–30, and Michael

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al-manajanîq) from about 1462, although as early as the 1180s Saladin's advisor Mardi bin Alî al-Târûsi describes a hybrid trebuchet and shows an awareness of the foreign provenance of the engine.[2] Al-Zaradkâsh's key word, *manajanîq*, is among possible sources for the term *mangonel*, a catapult employing the torsion method of propulsion (twisted ropes), but we have no comparable early eastern source, whether Islamic, Greek, or more distant, for a term designating the counterweight trebuchet that might have prompted a loan or calque in western European languages.[3] Unlike the smaller traction trebuchet, called *perrier* or "stone-thrower" in medieval French, for which projective power was generated by a group of men pulling sharply down on ropes attached to one end of a rotary beam or throwing arm, the counterweight or counterpoise trebuchet was a large siege engine with a very substantial counterweight attached or hinged to the shorter end of the rotary beam, and a long rope and sling for the missile at the end of the much longer section of the beam past the fulcrum. Prior to firing, the sling and missile lay in a trough under the machine. When tripped, the shorter end of the beam drew the sling into a great arc behind the machine, with the missile released at the top of the arc.

The present study is devoted to the origin of the name *trebuchet* and its significant parts, and their subsequent absorption into the medieval French and English of Britain. A sampling of European terminology displays great variation in orthography, but a clearly recognizable semantic core. We find Old French *trebuchet*, *trebuket*, *trebusket*, *trebuchel*, Provençal *trabuquet*, Catalan *trabuco*, *trabuquet*, Spanish *trabuquete*, Italian *trabocchetto*, Medieval Latin *tra-*, *trebuchetum*, and, on another orthographical tangent, French *trepeget*, *trepgette*, *tripgette*, *treget*, and the like.[4]

Basista, "Hybrid or Counterpoise? A Study of Traditional Trebuchets," *Journal of Medieval Military History* 5 (2007): 33–55.

2 Yusuf ibn Arunbughâ al-Zaradkâsh, *al-Aniq fiq al-manajanîq*, ed. Ihsân Hindi (Aleppo, 1985); Mardi bin Alî al-Târûsi, *Instructions for the Masters on the Means of Deliverance from Disasters in Wars, Oxford, Bodleian Library, MS Hunt 264*. ed. C. Cahen, as "Un traité d'armurerie composé pour Saladin," *Bulletin d'études orientales* 12 (1947–48): 103–63. An important new English-language resource for descriptions of siege engines in action in the Middle East is Ibn al-Atir, *The Chronicle of Ibn al-Atir for the Crusading Period from al-Kamil fi'l-Ta'rikh, Part 3, the Years 589–629/1193–1231: The Ayyubids after Saladin and the Mongol Menace*, trans. D.S. Richards (Aldershot, 2008).

3 Old and Middle French *mangonel*, Anglo-French *mangonel*, *magnel*, attested in many variant spellings from the 12th century onward in continental and British sources. A source in Greek is less likely. The engine was called *onager* by the Romans, who also knew the *ballista*, a torsion machine that threw bolts or darts.

4 For the Middle English evidence, see *Middle English Dictionary*, ed. R.E. Lewis et al. (Ann Arbor, 1959–2000), available at https://quod.lib.umich.edu/m/middle-english-dictionary. I return to

As concerns the etymology of *trebuchet*, a first consideration must be the Old French verb *trebuchier* "to stumble, trip." The larger semantic field of which *trebuchier* is a part includes *trebuc*, both "fall" and "trap," *trebuchage*, *trebuchement*, *trebucherie* "act of reversing, causing to fall," and *trebuchet* in the distinct sense of "tripping (a person) up." Old French *trebuc* "fall" and related words often occur in a homiletic, moral, or ethical context, where a fall is contrasted with some prior state of ascendancy, security, pride, or power.[5] Its use might be thought a recasting of the popular wheel of fortune motif as a seesaw, a device employing the same principle as the siege engine.

Little recognized from the vantage point of military history is the fact that the earliest attestations of the noun *trebuchet* in Old French refer not only to siege engines but to animal and bird traps. In the late 12th to earlier 13th century French *Renart* corpus (the beast epic about *Renard the Fox*) the trebuchet is listed with various others devices, snares, and mechanical traps that a villein sets for Renart. At its simplest the trebuchet could have been a beam or plank pivoting on a fulcrum, sending its unwary victim tumbling into a pit.[6] *Trebuchet* was used of a cucking-stool, in which malefactors were dunked,[7] and of simple sets of scales with a weigh beam. First attestations of *trebuchet* to designate siege engines are from about 1200.[8] Like much of medieval military

its evidence below. For related terms in the French of Britain, see William Rothwell et al., eds., *Anglo-Norman Dictionary*, 2nd ed. (London, 2005), available at http://www.anglo-norman.net. The vocabulary of siege engines everywhere in Europe was extremely entangled. After listing six different types of Aragonese engines, P.D. Humphries remarks: "That these words all describe siege engines is clear, but their exact meanings, which would accurately classify these machines, remains obscure"; P.D. Humphries, "'On Arms and Men': Siege and Battle Tactics in the Catalan Grand Chronicles (1208–1387)," *Military Affairs* 49 (1985): 173–78.

5 Amply illustrated in Gerhardt Tobler and Erhard Lommatzsch, eds., *Altfranzösisches Wörterbuch* (Stuttgart, 1925–2017), *s.v. trebuc.*

6 *Le Roman de Renart*, ed. Mario Roques (Paris, 1948–66), VII b, 6437.

7 Jocelin de Brakelond, *The Chronicle of Jocelin de Brakelond*, ed. H.E. Butter (London, 1949), 3: "Levaverunt homines de Illegga quoddam trebuchet, ad faciendum justiciam pro falsis mensuris panis vel bladi mensurandi." The "cucking stool" or "ducking stool" was, according to the *Oxford English Dictionary*, "an instrument of punishment formerly in use for scolds, disorderly women, fraudulent trades-people, etc., consisting of a chair (sometimes in the form of a close-stool) in which the offender was fastened and exposed to the jeers of the bystanders, or conveyed to a pond or river and ducked"; *Oxford English Dictionary: OED Online* (Oxford, 2019). Available at https://www.oed.com.

8 For example, *Le Roman de Renart*, ed. Ernst Martin (Strasbourg, 1882–87), XI, 2545; because of its satirical realism, the Raynard works are a treasure-trove of technical vocabulary. See further examples in *Altfranzösisches Wörterbuch*, Tobler and Lommatzsch. Jean de Meun, in his translation of Vegetius's *De re militari* complements the listing of catapults with an anachronistic reference to the trebuchet; Jean de Meun, *L'Art de chevalerie*, *Li abregemenz noble homme Vegesce Flave Renati Viri Illustris: Epitoma institutorum rei militaris*, ed. Leena Löfstedt (Helsinki, 1977), Book 4, 178.

reality, siege engines were so little exceptional that they were not singled out for special literary treatment as a motif or described in detail. A passage from one of the earliest Old French works to name the machines, the *chanson de geste Ogier le Danois*, illustrates how the term is, for this author as for many others, chroniclers included, part of a larger word set for siege engines. Ogier the Dane (Danish *Holger*) invests his fortresses against the attacks of Charlemagne's grandson, here called Kalles (Carloman).

> Li bons Danois ne s'i valt atargier,
> De Chestel Fort fist les murs esforcier
> Et Mont Quevrel qi est sus le rochier;
> Mult ricement les a fait batillier
> Et trebuquiaus et periere drechier;
> Tant furest fort, con j'oï tesmognier,
> Assalt ne crement de traite ne de lanchier;
> Ne doctent siege de duc ne de princier.[9]
>
> (The worthy Dane had no cause for delay. He had the walls strengthened at Chastel Fort and Mont Quevrel, which is situated atop a rock. He had them heavily fortified, and had counterweight and traction trebuchets installed. The castles were so strong, according to the testimony I have heard, that they feared attack neither with shot nor projectile, nor had they cause to fear any siege that might be laid by a duke or princely lord.)

The authoritative lexicographical work on the etymology of the French language is *Französisches etymologisches Wörterbuch*.[10] It is organized by etyma or root words, although the work is now complemented by an alphabetical index of all words treated. It is under the Frankish or Old Low Franconian head word *bûk* 'belly' that we find the discussion of *trebuchet* and related words.[11] This term is seen to have evolved in Old French as *bu*, *buc*, with the meaning "trunk (of a tree or human body)." Writing of the derivatives *trebuchier*, *trebuc*, and *trebuchet*, the editors state that these occupy a "special position" in the history of this word cluster. The first element would reflect the Latin preposition *trans* "through, across," seen in Old French as *tres* or *tre-*. The editors judge fortuitous any resemblance to Latin *trabs*, *trabis* "beam." The use of this and related terms

9 Mario Eusebi, ed., *La Chevalerie d'Ogier de Danemarche* (Milan, 1963), vv. 3435–42.

10 Kurt Baldinger, Jean-Denis Gendron, and Georges Straka, eds., *Dictionnaire étymologique de l'ancien français* (Québec, 1974-), has not yet treated *trebuchet*.

11 Walther von Wartburg et al., eds., *Französisches etymologisches Wörterbuch* [*FEW*] (Bonn, 1925–2002), *Germanische Elemente*, vol. 15.2, 3, 7, *s.v. bûk*.

for animal and bird traps is explained as these latter having first consisted of simple pits into which the prey fell, and only later of more elaborate arrangements with a triggering device. Omitted from this explanation is any discussion of the weigh beam of a set of scales. Livingston however, established that *buc* was used in Old French for the beam of a set of scales and for the simple yoke used to carry water (cf. English *bucket*, which originally referred to the yoke, not the two containers it carried).[12]

The *FEW* explanation of *trebuchet* may be judged plausible but doubts remain. As concerns the Gallo-Romance prefix *tre-*, it took on a reinforcing and perfective sense ("thoroughly") as well as denoting both lateral and vertical movement. Yet compounding with a nominal element must be judged anomalous. More on this later. It is rather the appeal to Old Low Franconian *bûk* "belly" that does least to explain core semantics. A more convincing origin for Old French *buc*, *bu* is Gaulish *bagus* "beech" (or possibly originally another tree);[13] a substratum effect, or cognate Germanic *bōkō* "beech" (cf. German *Buche*, English *beech*); an adstratum effect from Old Low Franconian. The smooth bole of the beech may have facilitated the transfer of the term to the human body and comparably shaped wooden beams. This does not directly assist in understanding the formation *trebuchier* or *trebuchet* but does at a minimum dispose of the awkward "belly" association. To return to the element *tre-* and its putative derivation from Latin *trans* "across," normal word formation in Gallo-Romance invites us to seek a verbal alternative in this position in the compound. This is readily available in Old French *treper*, *triper*, *tripper* "to dance," but also "to stumble" and possibly fall—positive and negative characterizations of nonstandard footwork, as it were.[14] *Treper* has a Germanic origin in Frankish (Old Low Franconian), and has cognates in Old English *treppe*, *trœppe* (whence English *trip*, which also came under the influence of Anglo-French *triper*). Although the Old French and Anglo-French lexical evidence is inconclusive, by the Middle English period *trippen* had the extended meaning "to cause to fall."[15] Conjoining the two elements here discussed, we have **trepe-buchet* "beam-tripper" or "trip-beam," for a device characterized by a pivot-mounted beam that is held down at one end that can be released, tripped. The designation can then be seen as centered on the key mechanics

12 C.M. Livingston, "L'Anc. fr. <<*bu*(*c*)>> et le fr. mod. <<*trebuchet*>>," *Revue de linguistique romane* 14 (1938): 237–56.

13 Xavier Delamarre, ed., *Dictionnaire de la langue gauloise: une approche linguistique du vieux-celtique continental*, 3rd ed. (Paris, 2018), *s.v. bagus*.

14 Frédéric Godefroy, ed., *Dictionnaire de l'ancienne langue française* (Paris, 1881–1902); Rothwell et al., *Anglo-Norman Dictionary*.

15 Lewis et al., *Middle English Dictionary*, *s.v. trippen*.

of the machine in such fashion as to distinguish it from other catapults. In the evolved form *trebuchet* the labials *p* and *b* would have assimilated as *b*. What appears a diminutive (via the suffix *-et*) may seem surprising for such a large instrument but may refer to the tapered end of the rotary beam, to which the sling is attached and where the locking down and releasing were effected (see further below). The many variant spellings may indicate a relatively early loss of the original semantics of the two parts of the compound.

Trebuchets were employed by British lords, both those who spoke Anglo-French as a first language, such as Richard I, and their successors, whose tongue we call Middle English. Siege engines were often given familiar names, as elements of psychological warfare that bonded the troops using them and also served to demoralize those against whom they were used, if they were unfortunate enough to learn of the names. Examples are Richard the Lion-Hearted's *Male Voisine* ("Bad Female Neighbor"), the Duke of Burgundy's *Periere Deu* ("Catapult of God"), Edward I's *Warwolf* ("Tight-Rigged Wolf"), and Charles VI of France's *Coyllar* (standard orthography *coillart* "Big-Balled"), a reference to sexual dominance and to the 800-kilo stone the commissioned engine was capable of firing.[16]

Written reference to the engines is first found in inventories of the materiel of war, at times in conjunction with the gear for ship's castles, so that we must imagine some lighter version of the machine being operated from a fighting castle at the mast head.[17] In literary works, the term is not isolated in a paratactic list but is grouped with comparable machines of war. "Þan ser Balaan … Buskes him in breneis with big men of armes. With traumes & with tribochetis þe tild to asaile" (Then Sir Balan … arms himself in a coat of mail with powerful men at arms, with siege towers and with trebuchets in order to attack the siege works).[18] A somewhat more graphic account is found in another English translation of the Bible. "Then lete Vaspasian avale the laddirs and lete cast stones an high on eche side of the wallis and made shote tribgettis and engynes and quarellis." (Then Vespasian had the ladders lowered and had stones cast aloft on every side of the walls and had trebuchets and other siege engines fired and

16 On the first two names, see Ambroise, *L'Estoire de la guerre sainte*, ed. Gaston Paris (Paris, 1897), vv. 4745, 4760. The *war* element of *Warwolf* is found in compounds indicating tightening, e.g., ships ropes, and the name means neither "werewolf" nor "war-wolf." A torsion trebuchet may be indicated.

17 "iij toppelynes, v twystlyne, v j tregetrop, vj trusses, ij tregett, ij Cranelynes, et j toppelyne," from an inventory of cordage and other nautical gear from 1359, given in Bertil Sandahl, *Middle English Sea Terms* (Uppsala, 1951–82), 3.150.

18 *The Wars of Alexander: An Alliterative Romance*, ed. W.W. Skeat, Early English Text Society, extra series 47 (London, 1886), 1296.

arbalests).[19] A last example will illustrate the same sense of wonder that we experience at the range of the trebuchet.

> An hundrid gynnys þey were vpset, Maungeneles and Treybochets. They leste of hem, the sothe to seye. Myght castyn a large myle of þe way (A hundred siege engines were erected, mangonels and trebuchets; the least of them, to tell the truth, could cast a full mile of the way).[20]

As noted, the orthographies for the names of the trebuchet and related instruments (trap, scales) that are recorded from trilingual medieval Britain vary quite considerably. The Middle English forms *trepeget*, *trepgette*, *trebgot*, *tripgette*, *treget* suggest that some recollection of the French word *jeter* "to throw, cast" may have been discerned in the second element.[21] English *trap* may also have been in play, blurring the phonic and semantic boundary of the French compound *trebuchet*. To return to an earlier stage, it cannot be ruled out (*pace* FEW) that Old French *tref* "beam" may also have continued to resonate in the names of the siege engine in both France and Britain. Although the borrowed term is not fully recontoured in English in the way that French *girasol* "turning with the sun, sunflower" is recast as *Jerusalem* (+ *artichoke*), this overall development—from French *trebuchet* to the many Middle English forms—may be put under the rubric of folk etymology.

As the siege engine became obsolete after the introduction of gunpowder, a written orthographical standard imposed itself in English—*trebuchet*—modeled on the then current French spelling, although the original significance of the name was doubtless obscured. Today, when historical and antiquarian interest has replaced military applications, siege engines and their names have again stimulated widespread interest. In discrete lexicographical terms we may close by saying that English *trebuchet* and its medieval variants may be seen as loanwords possibly affected by folk etymologizing, after being, in France and elsewhere, a quite accurate *terminus technicus* (basic signification "trip-beam") for several devices that could be cocked and then tripped, and for a siege machine whose fundamental mechanics were a short but heavily weighted arm rotating downward around a pivot in order to generate projective force at the other end, to which were attached the rope, sling, and destructive missile.

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19 *The* ME *Prose Translation of Roger d'Argenteuil's Bible en François, ed. from Cleveland Public Library* MS *W q 091.92 C468*, ed. P. Moe (Heidelberg, 1977), 84.13.

20 *The Seege or Batayle of Troye*, ed. M.E. Barnicle, Early English Text Society 172 (London, 1927, repr. 1971), 1065b.

21 On the interplay between *trebuchet* and *trejetour* "illusionist" in Chaucer, see William Sayers, "*Tregetours* in 'The Franklin's Tale': Stage Magic and Siege Machines," *Notes and Queries* 56 (2009): 341–46.

Because of widespread misunderstandings, both medieval and modern, it has been assumed that trebuchets were also capable of firing arrows or darts. This capability was reserved for the ballista and it is clear that the basic design of the trebuchet would not have permitted loading such missiles. Yet the *Middle English Dictionary* is explicit: "A siege engine designed to cast stones, darts, etc." In support, it adduces this pairing in an anachronistic Bible translation from about 1425: "Thei maden arblastis ether trepeiettis, that is, an instrument for to caste schaftis and stoonys" (they constructed arbalests or trebuchets, that is, an instrument for casting bolts and stones).[22] This confusion is best illustrated by a case history.

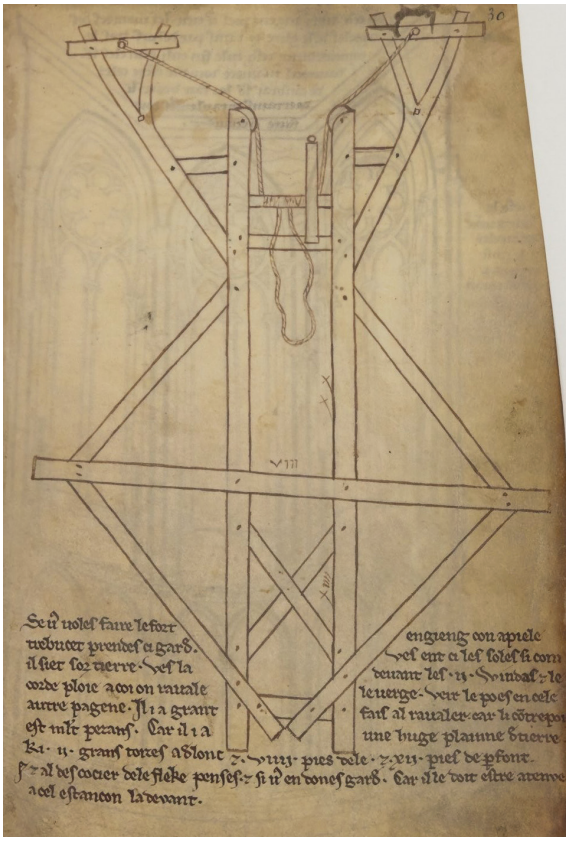

FIGURE 3.1 Portfolio of Villard de Honnecourt, fol. 30r: Trebuchet (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

22 John Wycliffe, *The Holy Bible … by John Wycliffe and His Followers*, ed. Josiah Forshall and Frederick Madden, 4 vols. (Oxford, 1850), I Mac. 6:20.

The northern French architect Villard de Honnecourt was active in the first half of the 13th century and left a portfolio of sketches relevant to his profession. A thoroughly modern facsimile edition of his surviving work is now available (Villard, 2009). Nonetheless, problems remain in reconciling his sketches with his textual commentary and its vocabulary, and his manuscript leaves with other contemporary evidence and modern scholarship. A single preserved leaf with a sketch of a trebuchet is a case in point (Figure 3.1). Villard's 13th-century text in the Picard dialect of northern French is as follows:

> Se vos voles faire le fort engieng c'on apiele trebucet prendes ci garde: Ves ent ci les soles si com il siet sor tierre. Ves la devant les .II. windas et le corde ploie a coi on ravale le verge. Veir le poes en cele autre pagene. Il a grantfais al ravaler, car li contrpois est m out pezans. Car il a une huge plainne de tierre, ki .II. grans toizes a de lonc et .VIII. pies de le, et .XII. pies de parfont. Et al descocier de le fleke penses et si vos en dones garde. Car ille doit estre atenue a cel estancon la devant.[23]

As a first orientation to this text, a translation from 1984 as reproduced in Philippe Contamine's *War in the Middle Ages*:

> If you want to make the strong engine which is called a trebuchet, pay close attention here. Here is the base as it rests on the ground. Here in front are the two windlasses and the double rope with which one draws back the beam as you can see on the other page. There is a great weight to pull back, for the counter-poise is very heavy, being a hopper full of earth which is two large toises [12 feet] long and nine feet across and twelve feet deep. Remember the arc of the arrow when discharged and take great care, because it must be placed against the stanchion in front.[24]

Very substantial revisions to this translation will follow below. Villard's account is not highly technical in nature. He names some few principal parts but the

23 Villard de Honnecourt, *The Portfolio of Villard de Honnecourt (Paris, Bibliothèque nationale de France, MS Fr 19093): A New Critical Edition and Color Facsimile*, ed. Carl F. Barnes (Farnham, 2009). The illustration may also be consulted as plate 59 in Villard de Honnecourt, *Carnet de Villard de Honnecourt: d'après le manuscrit conservé à la bibliothèque nationale de Paris (no 19093)*, ed. Alain Erlande-Brandenburg et al. (Paris, 1986). Villard's language has not been the object of exclusive study since F.E. Schneegans, "Ueber die Sprache des Skizzenbuches von Villard de Honnecourt," *Zeitschrift für romanische Philologie* 25 (1901): 45–70.

24 Philippe Contamine, *War in the Middle Ages*, trans. Michael Jones (New York, 1984), 103.

text is clearly secondary to the illustration(s), the second of which has not been preserved. The greatest problem is the term—how technical?—*fleke*, *flèche* in Modern French. This has often been understood as a lightly figurative term for a projectile that, *grosso modo*, resembled an arrow or bolt. Bechmann gives the most imaginative reconstruction of such an arrow-launching machine, but his speculations have been just as fully discredited (Chevedden 2004, 259–60, n. 68). In short, we have no other suggestion of trebuchets shooting arrows and the design of the engine makes this implausible if not outright impossible.

Now for a closer reading. Villard begins with the base beams (*soles*), the foundation of the engine. By means of these fairly substantial timbers the engine is seated (*siet*) on the ground. Villard puts the drawn-down rotating beam or throwing arm at the *devant* or "front" of the engine, although the cast will be over the trebuchet and toward the enemy, understood as at the "back." Also at the front (in the splayed-out illustration, to the two sides) are two windlasses or winches. Like its English counterpart, the term *windas* entered standard French from the Norman dialect, and represents Old Norse *vindáss* or "winding beam." Does the foreign term also correspond to a technological innovation? The winches are equipped with rope running through sets of pulleys (*corde ploie*), strong enough to support the great mass of the counterweight.[25] By means of the winches, the rotating beam or throwing arm (*la verge*) is drawn back down (*ravaler*), after a cast, to ground level and the counterweight (*contrepois*), mounted on a shorter length of the beam on the other side of the fulcrum, is correspondingly raised. This is an onerous undertaking (*fais*) because of the great weight, even using the windlasses, which we must assume incorporated a pulley system.

The counterweight consists of a large bin (*huge*), approximately 13 by 8 by 12 feet, length by width by depth. Villard states that the hopper is filled with earth (*tierre*), although rock or stone may have been more practical for easier filling and emptying and because of the greater relative mass. At the other end of the rotating beam is a long rope and sling, and a trigger or release device. When the end of the rotating beam is released, the counterweight drops. The sling with its projectile rises with the beam, until, near the top of its trajectory,

25 Pulleys or "pulley-mounted" is the most plausible interpretation of Villard's *ploie* (not discussed in Schneegans). It would be tempting to see here the past participle of Old French *ploier* "to fold" in the sense of "twisted, plied" but this verb is not attested in reference to cordage. Since the great mass of the counterweight (see further below) would have required a large number of men to raise it without some mechanical advantage, it is preferable to identify the term with pulleys, the Old French forms for which are *polie*, *poulie*, here metathesized in popular speech (Picard dialect?) to *ploie*. The exact grammatical relationship between Villard's *corde* and *ploie* is not clear.

one of its sides is released at the optimal moment by a carefully crafted hook. The freed projectile is sent flying, the counterweight crashes to the ground, and the rotating beam comes to rest. Naturally all of this would have been fine-tuned so that maximum energy was released with the projectile; the beam and framework were not subjected to needless stress and wear; aim was retained or could be adjusted for the next cast; reloading times minimized; etc.

The last two sentences of Villard's observations have caused the greatest problems for commentators: "Et al descocier de le fleke penses et si vos en dones garde. Car ille doit estre atenue a cel estancon la devant." Key terms here are *descocier*, *fleke*, *atenir* (the infinitive behind *atenue*), *estancon*, and *devant*; the last-named tells us at which end of the machine we are standing. The release of the projectile is a potentially dangerous moment, and Villard advises caution. The sling is being "uncocked" or rather "un-nocked" (*decochier* < *cocher* "to nock" < *coche* "nock of an arrow"), that is, released. The archery term has a superficial tie to *fleke*, if seen as "arrow," although this will prove, I contend, fortuitous or playful. The *estancon* "stanchion" is a bracing beam or pair of beams that might have run at a diagonal from below the fulcrum on the frame to a point on the ground near the tip of the rotating beam when drawn fully down. This prevented the trebuchet from tipping forward as the counterweight was raised. Villard states that the *fleke* is fastened to this stanchion "there in front" (*la devant*). Let us provisionally accept that the rotating beam has been locked down on the stanchion, which also has some form of release, and that the rope and sling lie in a trough or channel under the machine (a feature unmentioned by Villard). We now address the term *fleke*.

The conventional meaning "arrow" is ruled out, and even a much greater spar or beam with the relative proportions of a conventional arrow could not be cast with safety or accuracy by such an engine. In later French *flèche* had a number of very specific technical meanings, although we cannot say with certainty which of these may have been operative in the 13th century. For the architect, the *flèche* was the vertical distance from the ground to the top of an arc or arch. For the artilleryman or his predecessor, the *flèche* was the vertical measurement from the ground to the highest point of the trajectory of a projectile. And for the operator of an early crane, the *flèche* was measured at the fulcrum, to which the main beam of the crane was attached.[26] Let us assume that the rotating or throwing beam has been hauled down to near ground level, with the rope and sling lying in the channel beneath the frame. When the trebuchet is fired, that is, when the rotating beam is released, the

26 *Trésor de la langue française*, ed. Paul Imbs (Paris, 1971–99), *s.v. flèche*.

counterweight falls and the beam quickly rises. In trying to understand what Villard is warning against, we may rule out *flèche* as the distance to the top of the arc of the throwing beam, since any injury that the beam might do to a bystander would already have occurred. The same might be said of the about-to-be-released projectile at the top of its arc, which we may imagine as above and slightly "behind" the tip of the beam. The crane mounting terminology, on the other hand, directs us to the tip of the throwing beam. For men on the ground, the moment before the sling became airborne was the most dangerous. By *fleke* one might understand the arc that the still-loaded sling, not the beam, begins to describe "in front" of—in fact, at some distance from—the engine, as it is suddenly raised by, and cast outwards from, the rapidly rising beam.[27]

Villard's concern would then be less for the practiced artilleryman than for the inexperienced spectator, perhaps someone like himself. Yet, given the level of insight into the mechanics of the trebuchet represented in his caption, I judge that the solution to the problem of *fleke* is rather simpler than any of the possibilities reviewed above. *Flèche* was used in French of the narrower part of a mast or spar above the sail, of the spire of a tower, etc. In the case of the trebuchet, I believe that *fleke* means the tip or point of the tapered rotating beam (*la flèche de la verge*). This reduction in the cross-section of the beam is seen in contemporary illustrations and is a feature of modern replicas. The slimmer part of the beam past the fulcrum means more energy for the missile. Villard is simply saying that the spectator pay close attention to the tip of the rotating beam or throwing arm, where it is locked down and where the "trigger" or release mechanism will be activated. This is the same moment that is captured in the original semantics of the name *trebuchet* understood as "trip-beam." Given this interpretation of the single preserved drawing, we may assume that the missing second sheet was without text but illustrated the rotating beam and possibly its counterweight at one end, and rope, sling, and missile at the other, all features otherwise also lacking in our extant iconographical evidence. If also an aerial view, the second drawing could be imagined as a modern transparency that could be (mentally) laid over the first. The better understanding of Villard's caption for the sketch of the engine encourages a review of other persistent questions, such as the rigging of the winch ropes and the proportions of the parts of the superstructure, in particular the placement of the fulcrum along the rotary beam.

27 An excellent schematic illustration is available in Chevedden et al., 1995.

We may then translate Villard's commentary as follows and, in passing, note what better sense it makes than the translation published in Contamine's *War in the Middle Ages*:

> If you want to construct the powerful engine that is called a trebuchet, pay attention to this (illustration). Here you see the base beams and how the engine is seated on the ground. In front, you see the two windlasses and the pulley-rigged rope with which the beam is pulled back and down. See further on the next page. It is very hard work to pull it back, because the counterweight is very heavy. For there is a bin, filled with earth, two good toises (more than 12 feet) long and nine feet wide and 12 feet deep. And, when the tip of the rotating beam is released, remember to be careful. For it will have been locked down on the stanchion at the front.[28]

Villard de Honnecourt's brief description does not advance our knowledge of the counterweight trebuchet. Nor should we ascribe to it greater pretensions than it had in the 13th century. A better understanding of technical terminology—however idiosyncratic—and a more accurate translation do, however, put the author in better perspective not as artilleryman—but also not an ignoramus, one who believed that trebuchets could fire arrows.

The illustration and caption are also useful in dating technical enhancements to the engine. Here the counterweight has very substantial proportions, but there is no indication that it was hinged, an innovation that allowed the mass to drop in a straighter line, thus retaining greater force for the rotating beam (see Chevedden et al., 1995 for details and illustrations). Without adjusting for any difference between the medieval and modern foot as a measurement, the counterweight bin on Villard's machine would have had a capacity of about 1400 cubic feet, which, if filled with crushed stone (100 lbs/cu.ft), would have weighed in the neighborhood of 70 tons. These parameters suggest a very large and substantial structure for the frame and rotating beam. Current scholarship and attendant calculation programs give us an idea of the distances that could be reached with a suitable beam length and ratio between its two parts. It is judged that projectiles weighing up to one ton could have been cast by medieval counterweight trebuchets. Modern replicas and online media now

28 In this interpretation, the French text might be punctuated as follows: "Et al descocier, de le fleke penser et si vos en dones garde" rather than "Et al descocier de le fleke, penser et si vos en dones garde." The former does not, admittedly, represent the most conventional word order although it provides emphasis, but the latter is lightly tautological: "think and take care."

show finely shaped stone missiles but also, more whimsically, pianos and automobiles being hurled to startling distances.

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CHAPTER 4

Representational Conventions and Villard's Architectural Drawings

Maile S. Hutterer

FIGURE 4.1 Portfolio of Villard de Honnecourt, fol. 4r. (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

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Folio 4r of Villard de Honnecourt's Portfolio features three drawings: a bear, a swan, and a small architectural scene (Figure 4.1). The central building within the vignette takes a rectangular plan, possibly a basilican church.[1] Four additional buildings surround it—two are almost certainly towers; the other two are typologically ambiguous. A crenellated wall delineates the drawing's lower edge. Tucked behind the swan's feet, this small tableau has attracted far less attention than Villard's other architectural imagery, especially his folios featuring Reims Cathedral. This disparity follows the subjects' respective prominence within the Portfolio—Villard dedicates all or part of seven folios to images of the great cathedral of Reims, whereas he squeezes the architectural scene into the space surrounding the folio's primary images—the bear and the swan.[2] Nonetheless, this scene was interesting enough for Villard to draw a copy of it, suggesting its relevance within his larger collection.

In addition to differences of prevalence, modern scholarly interest in Villard's architectural imagery typically focuses on its place within the development of architectural drawing—the type of utilitarian image-making connected to workshop practices as part of design and construction processes.[3] The functionality of architectural drawings requires a literalism in their representation of physical space to facilitate their consistent interpretation by artisans or patrons. Thus, these drawings must effectively communicate spatial realities, including the relationship of a building's features to each other. Villard's Reims drawings, his plans of the chevets of Cambrai and Meaux Cathedrals, and his drawings of the Laon tower are among the most frequently cited in this discourse, even if none of these drawings displays the precision or unambiguous objectivity of a workshop drawing per se.[4] The architectural scene from folio 4r is a wholly different type of image. This vignette is more emblematic in nature, using architecture in a figurative rather than a literal sense. It offers little that would be helpful to a mason or patron in envisioning

1 Carl F. Barnes, *The Portfolio of Villard de Honnecourt* (*Paris, Bibliothèque nationale de France, MS Fr. 19093*)*: A New Critical Edition and Color Facsimile* (Burlington, 2009), 46. Bucher (*Lodge Books*, 54) refers to this as a palace.

2 Villard's drawings of Reims appear on fols. 10v, 15v, and 30v–32v. Fols. 10v and 15v include details of the cathedral along with other imagery; fols 30v–32v are full-page drawings.

3 A foundational study on this subject was Robert Branner, "Villard de Honnecourt, Reims, and the Origin of Gothic Architectural Drawing," *Gazette des Beaux-Arts*, 6th ser., 61 (1963): 129–46. For a critical bibliography of Villard de Honnecourt up to 1981, see Carl F. Barnes's *Villard de Honnecourt: The Artist and His Drawings; A Critical Bibliography* (Boston, 1982). A continuously updated version of this bibliography is now hosted on the AVISTA website: www.avista.org.

4 For a description of Villard's imprecision, see, for example, Robert Bork, *The Geometry of Creation: Architectural Drawing and the Dynamics of Gothic Design* (Burlington, 2016), 31–32.

or constructing an architectural project. I would term this sketch an architectural representation, rather than an architectural drawing. However, while distinguishing between these types of images usefully calls attention to their distinct functions, such an exercise is simultaneously arbitrary, especially in the context of Villard's Portfolio, with its diverse range of subjects and fluidity of representational strategies.[5]

In the following remarks, I offer some thoughts on Villard's use of established architectural conventions across the spectrum of his architectural imagery. I consider how these conventions, which are so visible in drawings like the folio 4r vignette, might similarly inform Villard's more technical drawings. If all of Villard's architectural imagery operated within a system of common representational strategies, regardless of the source material for each image (e.g., manuscript, workshop drawing, or observed building), it suggests a dynamic fluidity in his artistic practice. Consequently, interpreting these representational strategies may deepen our understanding of Villard's drawings and their place within 13th-century artistic production. The continuity of representational strategies across drawing types implies reciprocity between architectural imagery produced for wildly different purposes—from narrative frames to working drawings. Villard's Portfolio, with its wide range of subjects, makes an exceptional testing ground for this proposition. To the degree that his various architectural imagery demonstrates similar strategies, we can surmise how Villard leveraged subjective and objective modes to record his subjects in a manner that would make sense to him and to any audience he may have imagined for his drawings.

To begin this exploration, let us return to folio 4r and the architectural imagery tucked behind the swan's feet. The emblematic nature of Villard's architectural vignette is evident in its spatial ambiguity. The exact relationship between the various buildings from folio 4r is difficult to determine. The two towers may be meant to be read as attached to the basilican structure. However, their irregular positions at its front and side are curious and seem to preclude their interpretation as twin towers flanking a façade. The other two buildings are more likely independent structures. A tall, thin building appears in the background; a low and long building appears in the foreground, overlapping the leftmost tower. Villard's indifference to accurate spatial representation is perhaps best indicated by the fluid link between the crenellated wall and the low building in the foreground. These join together at the building's

5 Jean Wirth has previously noted Villard's application of the conventions seen in the architectural representation on folio 4r to his other architectural drawings. Wirth, *Villard de Honnecourt: Architecte du XIIIe siècle* (Geneva, 2015), 114.

bottom left corner. A similar alignment of building edges occurs on the left and right sides of the drawing.

The spatial ambiguity of Villard's architectural vignette illustrates some of the early medieval representational strategies catalogued by Paul Lampl in his 1961 essay.[6] As discussed by Lampl, early medieval artists prioritized an ideal image that presented the essential features of a building through the juxtaposition of seemingly incongruous views. This conflation of successive vantages might stitch together multiple sides onto a single plane, combine interior and exterior images, or enhance select salient features at the expense of others. Consequently, a building's actual size, its proportions, and its spatial relationships become irrelevant to its depiction.[7] Villard's basilican structure displays the representational strategy that Lampl termed a "two-sided view," in which the image shows two sides of a building but maintains a single horizontal line across these disparate planes.[8] The same convention dictates the representation of Villard's ambiguous multistoried building in the background. This conventional strategy prioritizes the rendering of multiple façades over the representation of spatial relationships.

Lampl's examples of two-sided views derive primarily from Roman, early Christian, and Carolingian objects. The visual parallels between these early medieval examples and Villard's drawing perhaps support François Bucher's supposition that Villard copied this image from a Carolingian or Ottonian model. Bucher pointed to many similar examples as comparative material, including the ivory cover of the Prayer Book of Charles the Bald (*c*.870) and the illumination of Psalm 26 from the Utrecht Psalter (a manuscript also discussed by Lampl) (Figure 4.2). Both exemplify Lampl's two-sided view in their depiction of a basilican structure.[9] It is easy to imagine Villard copying from such an object, especially given other drawings within the Portfolio that suggest ancient or early medieval models, such as the tomb of a Saracen on folio 6r and the standing nude on folio 22r.[10]

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6 Paul Lampl, "Schemes of Architectural Representation in Early Medieval Art," *Marsyas* 9 (1961): 6–13.

7 Lampl, "Architectural Representation," 7.

8 Lampl, "Architectural Representation," 8.

9 Bucher (*Lodge Books*, 54) points to illustrations 38–40, 44, and 58 from John Beckwith, *Early Medieval Art: Carolingian, Ottonian, Romanesque* (New York, 1964).

10 On Villard's interest in ancient models, see, for example, Jean Adhémar, "Villard de Honnecourt," in *Influences antiques dans l'art du moyen age français: Recherches sur les sources et les themes d'inspiration* (London, 1939), 278–80. A summary of scholarship on the Tomb of a Saracen is provided in Barnes, *Portfolio*, 53–54. See also Miachel V. Schwarz, "Le Sepouture dun Sarrazin: Bilder von Antike bei Villard de Honnecourt," *Acta*

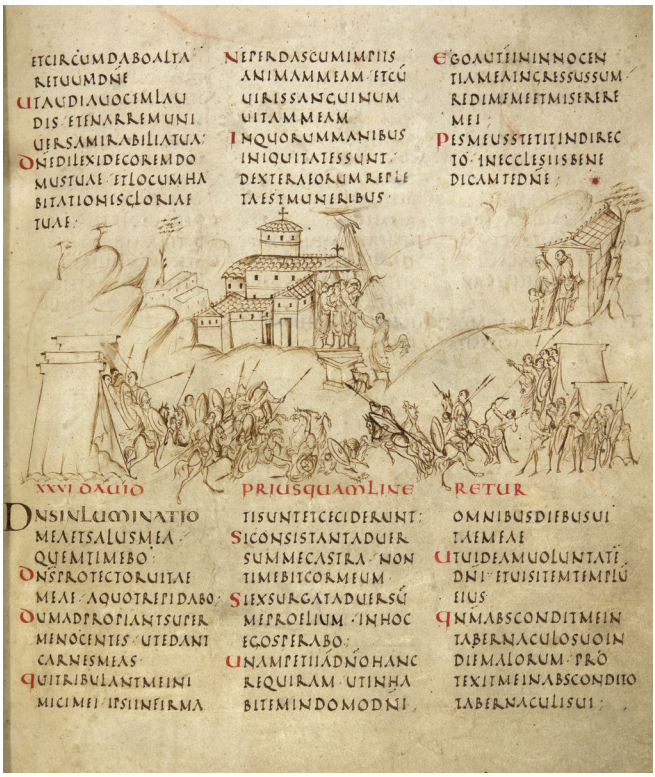

FIGURE 4.2 Utrecht Psalter, Psalm 26 (Utrecht, Universiteitsbibliotheek, MS Bibl. Rhenotraiectinae I Nr 32)
PHOTO: UNIVERSITY OF UTRECHT

While the parallels between early medieval architectural representation and Villard's architectural scene are compelling, artists continued to use the conventions identified by Lampl in subsequent centuries and throughout Villard's lifetime. Consequently, rather than seeing the architectural sketch from folio 4r as exemplifying an unequivocally antiquarian interest, I would suggest that it participates in ongoing and standard representational practices,

Archaeologica Academiae Scientiarum Hungaricae 36 (1993): 31–40; Carl F. Barnes and Lon R. Shelby, "The Preliminary Drawing for Villard De Honnecourt's 'Sepulchre of a Saracen,'" *Gesta* 25, no. 1 (1986): 135–38; Philippe Verdier, "La 'Sepouture d'un Sarrazin' de Villard de Honnecourt," *Journal des Savants* (1983): 219–28; Roland Bechmann, "Geometry and Symbolism in Villard's 'Tomb of a Saracen,'" *AVISTA Forum Journal* 12 (2002): 14; idem, "The Saracen's Sepulcher: An Interpretation of Folio 6r in the Portfolio of Villard De Honnecourt," In *Villard's Legacy: Studies in Medieval Technology, Science and Art in Memory of Jean Gimpel*, ed. Marie-Thérèse Zenner (Burlington, 2004), 121–34.

familiar to Villard and his contemporaries. Elizabeth Carson Pastan explored representational strategies in the Bayeux Embroidery, noting conventions similar to those identified by Lampl.[11] Among examples contemporary to Villard, comparable imagery appears in the architectural canopies covering the jamb statues at Chartres Cathedral—perhaps especially the several basilican structures in the canopies of the Royal Portal (Figure 4.3).[12] The stained glass from Chartres is another fruitful comparison. The Thomas Becket window (*c*.1215–25) represents Canterbury Cathedral in a two-sided view, showing the front and side façades in a single horizontal sweep (Figure 4.4). As discussed by Claudine Lautier, the majority of 13th-century narrative windows use the compound perspective visible in the Becket window when representing churches. The view of lateral façades permits the representation of flying buttresses and their supporting piers, showcasing the most up-to-date architectural fashions, even if rendered imprecisely.[13] While conventions like the two-sided view appear widely in 13th-century art, Villard's interest in Chartres makes the cathedral especially relevant to the Portfolio. Villard included five drawings of details of the cathedral, likely resulting from a visit to the construction site.[14] Consequently, it seems almost certain that he would have encountered at least some of this imagery first hand.

In sum, what we know about Villard's architectural vignette is that it uses conventions for representing buildings that date back to Roman antiquity and that continued to be practiced through Villard's day. These conventions distorted spatial realities but allowed artists to convey a potent mental concept focused on the structure's most salient features (e.g., the rectangular shape of a basilica or the presence of novel buttressing systems). Finally, while Villard was drawing architecture in this image, he was almost certainly copying from a nonarchitectural source, whether it be a manuscript, ivory, sculpture, or stained-glass window. While the precise model from which he worked remains elusive in date and medium, it seems likely that Villard's interest flowed not

11 Elizabeth Carson Pastan, "Building Stories: The Representation of Architecture in the Bayeux Embroidery," *Anglo-Norman Studies* 33 (2011): 151–86.

12 Jean-Baptiste-Antoine Lassus (*Album de Villard De Honnecourt, Architecte du XIIIe siècle: manuscript publié en facsimile*. [Paris, 1858; reprinted Paris, 1976], 69) suggests that the drawing is similar to those "au-dessus des pinnacles des statues," but he does not indicate which ones. Barnes (*Portfolio*, 46) compares the drawings to the canopies over the jamb figures at Chartres and Reims specifically.

13 Claudine Lautier, "Les édifices religieux et leur construction dans les vitraux narratifs de la première moitié du XIIIe siècle," in *Représentations architecturales dans les vitraux* (Brussels: 2002), 44.

14 Barnes, *Portfolio*, 220.

FIGURE 4.3 Chartres, Cathedral of Notre-Dame: Royal Portal, South Entrance
PHOTO: ALISON STONES

FIGURE 4.4 Chartres, Cathedral Notre-Dame. Becket goes to Canterbury. Panel 20 of window 18
PHOTO: © PAINTON COWEN WWW.THEROSEWINDOW.COM

from the architecture itself but from the representation of architecture on a two-dimensional (or low-relief) surface.

Several of Villard's other architectural representations also use a compound perspective.[15] One such image is the building on folio 18v, variously interpreted as a tabernacle, a castle, and the Temple of Solomon (Figure 4.5).[16] Modern scholarly interest in this image has primarily focused on the question of Villard's knowledge of practical geometry, following his caption: "Here begins the art of the techniques of representation as the discipline of geometry instructs for facilitating work."[17] The drawing is inscribed with a pentagram, which Barnes notes was made after completion of the tabernacle/temple. Other shapes on the same folio were drawn in advance of the figures they inscribe. This variation of sequence complicates the traditional interpretation of Villard's geometric shapes as generative forms, especially when considered together with the very approximate relationship between the shapes and the figures.[18] The function of these shapes continues to be a matter of scholarly discussion.[19]

The pentagram-inscribed building does not display Lampl's two-sided view, but it nevertheless presents a single image constructed from multiple vantages. For example, Villard combines an aerial view of the tower's upper platform with one of its vertical elevations. The rest of the building appears from a single oblique vantage, although shown with an incoherent perspective in which parallel lines do not converge toward a consistent point. It is also interesting to note that in this drawing, as in the drawing from folio 4r, Villard has lined up

15 Wirth also identifies several instances in which Villard projected two orthogonal surfaces on the same plane (*Villard de Honnecourt*, 114).

16 Robert Willis, *Facsimile of the Sketch Book of Wilars de Honnecort with Commentaries and Description by M. J. B. A. Lassus and M. J. Quicherat: Translated and Edited with Many Additional Articles and Notes by the Rev. R. Willis* (London, 1859), 113; Bucher, *Lodge Books*, 112; Renaud Beffeyte, "The Oral Tradition and Villard de Honnecourt," in *Villard's Legacy: Studies in Medieval Technology, Science and Art in Honor of Jean Gimpel*, ed. Marie-Thérèse Zenner (Aldershot, 2004), 94.

17 Barnes, *Portfolio*, 116.

18 Barnes, *Portfolio*, 116. Viollet-le-Duc exemplifies the traditional, generative, interpretation. Eugène Emmanuel Viollet-le-Duc, *Dictionnaire raisonné de l'architecture française du XIe au XVI siècle*, 10 vols. (Paris, 1854–68), 8:265–67.

19 Frankl ("The Secret of the Mediaeval Masons," *The Art Bulletin* 27, no. 1 [1945]: 46–60) proposed that they assisted in the transfer of two-dimensional drawings to three-dimensional works of sculpture. Bechmann suggested that they operated mnemonically (*Villard de Honnecourt*, 306–12). For a critique of these proposals, see Stephen Perkinson, "Portraits and Counterfeits: Villard de Honnecourt and Thirteenth-Century Theories of Representation," in *Excavating the Medieval Images, Manuscripts, Artists, Audiences: Essays in Honor of Sandra Hindman*, ed. David S. Areford and Nina A. Rowe (Aldershot, 2004), 15; Barnes, *Portfolio*, 112–13.

Ci comence li force des trait de
portraiture si con li art de iometrie
les ensaigne · por legierement ouvrer.
Et en lautre fuiel se cil ble ognerie.

FIGURE 4.5 Portfolio of Villard de Honnecourt, fol. 18v. (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

different edges and corners along continuous verticals, seen here most clearly where the bottom corner of the tower's crenellations meets the tower's left side and the crenellation of the wall below. A similar convergence appears in

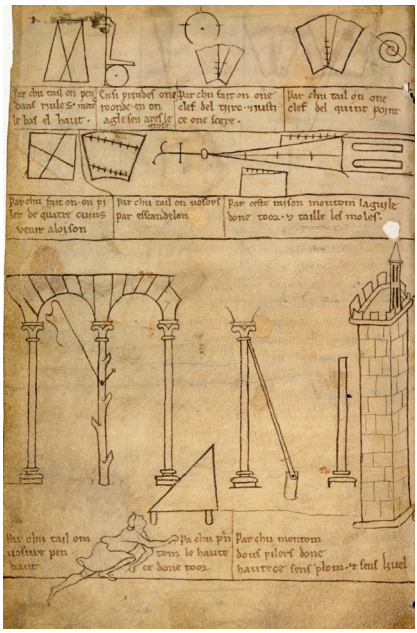

FIGURE 4.6
Portfolio of Villard de Honnecourt, fol. 20v. (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

Villard's depiction of a tower on folio 20v, in an illustration showing a technique of measuring a building's height (Figure 4.6).[20]

These last two examples demonstrate Villard's repeated use of established representational conventions throughout the Portfolio, but neither drawing approaches an architectural (or workshop) drawing, even in the context of Villard's inexact drafting. Like the vignette from folio 4r, each represents an ideal or generic building rather than a plan or study of an individual site. When considering Villard's more technical drawings, many modern scholars have called attention to the exaggerated size of the oxen on his elevation of a tower of Laon Cathedral (fol. 10r; Figure 4.7). As noted by Robert Bork, the Laon tower elevation incorporates the basic proportioning scheme of the actual tower, including some dimensions derived from the geometric process of quadrature, while simultaneously integrating a quasi-perspectival system akin to architectural illustration in manuscript illumination.[21] In other words, the Laon tower elevation is a hybrid drawing, combining knowledge of workshop

20 This folio shows evidence of scraping and redrawing, especially in the top two registers. The drawing of the tower, which appears in the lowest register, does not seem to have been redrawn. Barnes, *Portfolio*, 140–45.

21 Bork, *Geometry of Creation*, 37–40. For an alternative interpretation of Villard's inconsistent use of scale, see Wirth, *Villard de Honnecourt*, 111–12.

practices with the more impressionistic representational conventions related to the figurative arts. Following Lampl and Pastan, Villard's emphasis on Laon's oxen would indicate more than merely his interest in them. Beyond his curiosity, the exaggerated size of the oxen suggests Villard's recognition of them as distinctive features that make Laon Cathedral easily recognizable.[22] The amplification of the oxen thus accords with conventional practices for architectural representation in enlarging essential features at the expense of unessential ones, as seen in many examples, from the Utrecht Psalter to the Bayeux Embroidery.[23] In this context, the enlarged bovines become integrated parts of the tower's design, in addition to and beyond their importance as traces of Villard's subjective impressions.

Similar representational conventions appear in Villard's other architectural drawings. Roland Recht has previously noted similarities between manuscript illuminations and 13th-century architectural drawings, including those in Villard's Portfolio. For example, he observes that Villard and the illuminator of the St. Eloi Roll represent perspective by cutting the foreshortened side of a structure in half vertically (Figure 4.8).[24] This technique appears most clearly in Villard's drawing of a horologe (clocktower) from folio 6v (Figure 4.9). Although not rendered as precisely as the Laon drawings, the generative nature of the horologe's geometrical forms—in this case, squares and equilateral triangles—perhaps suggests a connection to architectural drawing.[25] A preliminary graphite drawing marks out the horologe's exterior dimensions, and ink dots indicate the compass center points.[26] Its vertical stories follow a system of rotated squares, which Villard may or may not have understood himself. In this variant, the building rises from a square base to an octagonal middle story, to a square top story.[27]

Recht further notes that manuscript illumination in the later 13th century, and in particular, the Psalter of Saint Louis (BnF lat. 10525), presents a geometrical precision comparable to that in architectural drawings such as the Reims Palimpsest

22 Bork notes that the oxen are located at a point of geometrical significance (halfway up the first of two squares that determine the height of the tower). He convincingly argues that they served as geometrical markers (*Geometry of Creation*, 38). I would suggest that these two interpretations easily coexist.

23 Lampl, "Architectural Representation," 9; Pastan, "Building Stories," 165–66.

24 Roland Recht, "Sur le dessin d'architecture gothique," in *Études d'art medieval offerts à Louis Grodecki*, ed. Sumner McKnight Crosby et al., 233–50 (Paris, 1981), 236.

25 Nigel Hiscock, "Architectural Geometry and the Portfolio of Villard de Honnecourt," in *Villard's Legacy, Studies in Medieval Technology, Science and Art in Honor of Jean Gimpel*, ed. Marie-Thérèse Zenner (Aldershot, 2004), 7.

26 Barnes, *Portfolio*, 55; Wirth, *Villard de Honnecourt*, 135.

27 Barnes, *Portfolio*, 56.

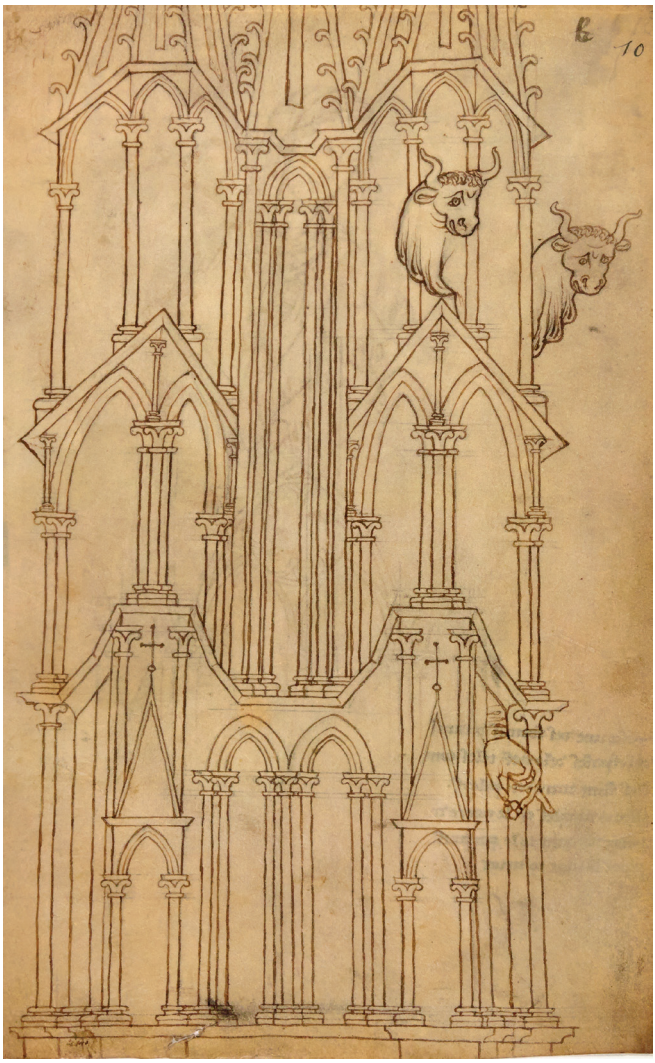

FIGURE 4.7 Portfolio of Villard de Honnecourt, fol. 10r. (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

and the Strasbourg Façade Drawings.[28] The Psalter also, unusually, replicates a consistent grouping of architectural motifs, which were likely modeled on the

28 Recht, "Dessin d'architecture gothique," 238–39. Paris, Bibliothèque nationale de France, lat. 10525. On the relationship between the Psalter of Saint Louis and contemporaneous architectural design, see Harvey Stahl, *Picturing Kingship: History and Painting in the Psalter of Saint Louis* (University Park, 2008), 83–89.

FIGURE 4.8 Roll of Saint Eloi, Miracle of Saint Eloi at the tomb of Saint Denis
PHOTO: ALAMY; PARIS, MUSÉE CARNAVALET

FIGURE 4.9
Portfolio of Villard de Honnecourt, fol. 6v. (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

Sainte-Chapelle.[29] Recht's comparison between manuscript illumination and architectural drawing is bolstered, perhaps, by the fact that Villard seems to

29 Carl F. Barnes, "Cross-Media Design Motifs in XIIIth-Century France: Architectural Motifs in the Psalter and Hours of Yolande de Soissons and in the Cathedral of Notre-Dame at Amiens," *Gesta* 17, no. 2 (1978), 40 n. 4.

have used similar geometrical tools for both his figurative and his architectural sketches, including a circular template. Such a tool explains correlations in linear and circular measurements between unrelated drawings, such as those seen in the Laon tower plan and the male head on the same folio (fol. 9v).[30] It further implies a shared generative process between figurative imagery and architectural drawing, suggesting a continuity of practice between these two genres.

If we accept a continuity between architectural imagery and architectural drawing—for example, the extension of conventions observed in the vignette from folio 4v into drawings like the Laon tower façade—it seems reasonable to expect these same conventions to appear in Villard's Reims folios (Figures 4.10–4.12). These are the drawings which are most closely associated with workshop practice and which have generated the fiercest scholarly debate about Villard's profession and audience. Indeed, many scholars have suggested that Villard copied these drawings from originals produced by the workshop.[31] Others have argued that he drew from direct observation of the cathedral, probably with some level of access to the workshop itself.[32] In either case, Villard's elevation drawings of Reims are among the most innovative in the Portfolio, demonstrating his experimentation with different types of perspectival systems, including orthogonal representation, or parallel projection, for which we have no surviving precedent in European medieval art.[33]

Among the most studied aspects of Villard's Reims drawings are their differences from the cathedral as built. Scholars have variously suggested that these differences represent earlier designs,[34] mistakes,[35] or improvements.[36]

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30 This correspondence was discovered by Rebecca Price and published by Barnes in *Portfolio*, 21–22.

31 For example, James S Ackerman, "Villard De Honnecourt's Drawings of Reims Cathedral: A Study in Architectural Representation," *Artibus et Historiae* 18, no. 35 (1997): 42; Walter Überwasser, "Massgerechte Blauplanung der Gotik an Biespielen Villards de Honnecourt," *Kunstchronik* 2 (1949): 200–04; Bucher, *Lodge Books*, 168. Bork concurs with these authors on Villard's access to workshop drawings for Reims but, interestingly, posits a combination of visual and verbal models for his Laon drawings (*Geometry of Creation*, 31, 40).

32 Robert Branner, "Villard de Honnecourt, Reims, and the Origin of Gothic Architectural Drawing," *Gazette des Beaux-Arts*, 6th ser., 61 (1963), 137; Hans Reinhardt, "Villard de Honnecourt," in *La cathédrale de Reims* (Paris, 1963), 83–88, 102–03; Jean A. Givens, *Observation and Image-Making in Gothic Art* (New York, 2005), 68–69.

33 Ackerman, 42.

34 E.g., Henri Deneux, "Des modifications apportées à la cathédrale de Reims au cours de sa construction du 13e au 15e siècle," *Bulletin monumental* 106 (1948), 122; Reinhardt, "Villard de Honnecourt"; Jean Bony, *French Gothic Architecture of the 12th and 13th Centuries* (Berkeley, 1983), 270 and 504, n. 19.

35 E.g., Branner, "Gothic Architectural Drawing," 137–38.

36 E.g., Roland Bechmann, "Les dessins techniques du Carnet du Villard de Honnecourt," in *Carnet de Villard de Honnecourt*, ed. Alain Erlande-Brandenburg, Régine Pernoud, Jean

FIGURE 4.10
Portfolio of Villard de Honnecourt, fol. 31r. (Paris, Bibliothèque nationale de France, MS fr. 19093)
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FIGURE 4.11
Portfolio of Villard de Honnecourt, fol. 31v. (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

Gimpel, and Roland Bechmann (Paris, 1986), 41; William W. Clark, "Reims Cathedral in the Portfolio of Villard de Honnecourt," in *Villard's Legacy: Studies in Medieval Technology, Science and Art in Honor of Jean Gimpel*, ed. Marie-Thérèse Zenner (Aldershot, 2004), 32.

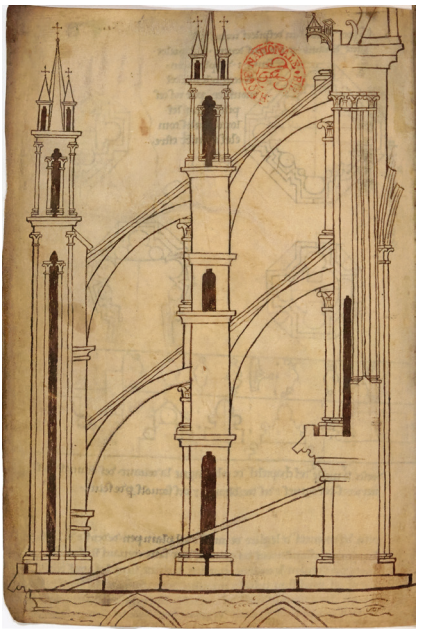

FIGURE 4.12
Portfolio of Villard de Honnecourt, fol. 32v. (Paris, Bibliothèque nationale de France, MS fr. 19093)
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William Clark valuably reframed the discussion around these differences by proposing that they reflect Villard's individual experience of the cathedral. For example, following a suggestion offered by Carl Barnes, Clark theorized that the triforium passage appears proportionally taller because Villard made the drawing while inhabiting that space.[37] One might equally posit that the exaggerated height of that story reflects Villard's memory of having been in the triforium. Perhaps his memory of occupying that space caused him to recall it with enhanced prominence when producing the drawing at a later date. In either case, when approached through the lens of embodied experience, the divergence of the drawings from the physical building reflects perception rather than Villard's presumed limitations as a draftsman.

Considering the Reims drawings in the context of representational conventions for architectural images, the assumption of verisimilitude similarly falls away. As such, the drawings' divergence from the cathedral reflects Villard's values—what he understood to be important about his subject and worthy of commemorating on the expensive parchment. These representational strategies suggest that the exaggerated size of the triforium would have been of

37 Clark, "Reims Cathedral," 50. As reported by Clark, Barnes made this suggestion following the oral presentation of Clark's paper at the 35th International Congress on Medieval Studies.

no consequence to Villard or his contemporaries outside the architectural workshop. Instead, if Villard focused on the bar tracery windows and the vertical articulations, they may have epitomized an identifiable and novel linear effect.[38] He also arguably captured the experience of the building's proportions, even if he did not accurately represent their physical size.[39]

Some of Villard's other modifications similarly fit within these long-established representational conventions.[40] These changes include his translation of angel statues from the buttress uprights to the clerestory cornice on folios 31v and 32v—renderings of the interior and exterior elevations and the buttressing, respectively (see Figures 4.11–4.12). As many have noted, in these drawings, the position of the buttressing statues appears to be borrowed from the placement of similar angel statues on the radiating chapels, represented true-to-life on folio 31r. There are many possible ways to explain this alteration, from Villard's intentionally improving the design to misremembering the angels' placement. However, I would suggest that the statues' actual arrangement on the buttresses may not have been as important as their presence.

The buttress sculptures seem to have been significant features for Villard. His consistent placement of the clerestory angels over the two folios demonstrates his interest in them, even though this placement does not match the physical building. On both folios 31v and 32v, the angels appear below the clerestory wall cornice, replacing the atlantids of the physical cathedral.[41] The shift in placement for the elevation drawing is partially explained by Villard's omission of the buttress uprights, making it impossible for him to have placed the statues with mimetic accuracy. Presumably, the absence of the uprights permitted him to concentrate on the surface articulation of the clerestory and the richness of its vertical shafts and arch moldings.[42]

At the same time, neither folio presents a carefully rendered drawing of the clerestory angel statues. Villard's representation of the chevet buttresses omits the statues altogether, indicating their placement solely through empty aediculae between the top of the flyer head and the cornice. Interestingly, the architectural canopy that covers these aediculae present the same juxtaposition of successive views discussed earlier for the vignette on folio 4r, especially in the presentation of the tower, which shows the parapet and the elevation

38 Hearn, "Villard de Honnecourt's Perception of Gothic Architecture," 131. On Villard's focus on distinguishing features, see also Clark, "Reims Cathedral," 33.

39 Clark, "Reims Cathedral," 48.

40 Wirth, *Villard de Honnecourt*, 110–18.

41 Clark, "Reims Cathedral," 34.

42 Hearn, "Perception of Gothic Architecture," 131.

FIGURE 4.13
Portfolio of Villard de Honnecourt, fol. 19r. (Paris, Bibliothèque nationale de France, MS fr. 19093)
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from different angles. On the elevation drawing, Villard drew the statues in abstract geometric forms as a series of triangles. These schematic renderings are similar to the geometry indicated for human figures elsewhere in the Portfolio, such as on folio 19r (Figure 4.13). The presentation of these angels is quite distinct from the greater realism with which Villard renders those of the radiating chapels, depicted on the recto of the same folio. The proximity of these drawings makes the differences in the angels' style of representation all the starker.

Clark has suggested that Villard's interest was primarily in the chapel angels' distinctive placement at the top of the pier buttresses, noting that this configuration was never repeated.[43] Building off Clark's work, I suggest that Villard may have found the very integration of sculpture and buttressing, which was still relatively new in the mid-13th century, compelling. The only earlier example would have been Chartres, where statues are also located in the buttress uprights.[44] It is possible, therefore, that Villard was drawing attention to the combination of buttressing and monumental figurative sculpture, regardless of the precise configuration that it took—not wholly unlike a

43 Clark, "Reims Cathedral," 33–34.

44 Maile Hutterer, *Framing the Church: The Social and Artistic Power of Buttresses in French Gothic Architecture* (University Park, 2020), 90–92, 99.

glazier's impressionistic depiction of flying buttresses in narrative windows. The context of representational conventions redefines the difference between the drawing and the physical building from a "mistake" or "improvement" to a representational strategy—one that allows for the reconfiguration of building components to include the features of greatest interest.[45] The presence of these conventions in the architectural canopies of the same drawings suggests Villard's continued engagement with them, even as he represented other aspects of the cathedral with exceptional fidelity. Indeed, the conventions themselves suggest no tension between precision and ambiguity within the same image. Instead, they would comfortably accommodate Villard's mercurial interests and attentions, allowing him to move fluidly between technical and emblematic drawing. This multifaceted working process equally accommodates other places where Villard either omitted information about the cathedral (e.g., the vaulting of the radiating chapel on folio 30v) or changed the building (e.g., the tall passages within the buttress uprights). It also normalizes the mixed perspective of the buttress piers in the nave elevation. As we have seen, this type of mixed perspective would have been familiar to Villard and his contemporaries.

To suggest that Villard relied on centuries-old conventions for architectural representation is not to deny the innovation present within the Portfolio, nor is it to minimize the Portfolio's importance as an exceptional document that speaks to the emergence of architectural drawing. A preponderance of evidence suggests that drawing became an increasingly visible and valued part of architectural practice over the 13th century.[46] Villard's Portfolio unquestionably demonstrates aspects of these emergent practices. At the same time, Villard's drawings consistently reveal an interest in idealized forms, in mental concepts of figures and buildings with only oblique connection to physical reality.[47]

Modern scholarship has increasingly moved toward an understanding of Villard as an architectural enthusiast—a non-specialist who nonetheless

45 See also Wirth, *Villard de Honnecourt*, 112.

46 Foundational studies on this topic include Maria Velte, *Die Anwendung der Quadratur und Triangulatur bein der grund- und aufrißgestaltung der gotischen Kirchen* (Basel, 1951); and François Bucher, "Design in Gothic Architecture: A Preliminary Assessment," *Journal of the Society of Architectural Historians* 27 (1968): 49–71. This work has subsequently been furthered and expanded by studies such as Christian Freigang, "Changes in Vaulting, Changes in Drawing. On the Visual Appearance of Gothic Architecture around the Year 1300," in *The Year 1300 and the Creation of a New European Architecture*, ed. Alexandr Gajewski and Zoë Opačić (Turnhout, 2007), 67–78; Bork, *Geometry of Creation*.

47 Perkinson, "Portraits and Counterfeits," 16.

harbored a great interest in buildings and was permitted significant access to construction workshops.[48] Perhaps, as George Brooks argues in this same volume, Villard was a carpenter-engineer, who would have possessed an elemental knowledge of masonry practice through his work on construction sites.[49] The Portfolio's blending of representational strategies supports this picture. Villard's drawings reveal a clear interest in the geometry of the medieval mason, but a simultaneous adherence to ingrained ways of seeing. In other words, the Portfolio fits the increasingly esoteric knowledge of master builders into a more broadly familiar representational language. Villard may have merged technical and emblematic drawing consciously, as an intentional translation to increase the accessibility of his images. More likely, Villard unconsciously absorbed existing representational strategies, working some aspects of workshop drawing into a more normative and universal artistic practice, perhaps aided by copying workshop drawings. In either case, the resulting images facilitate their legibility by a knowledgeable, but nonspecialized, audience by limiting the hermetic craft of architectural drawing to select areas, presumably those on which Villard aimed particular focus. In this way, key aspects of design or construction might be conveyed accurately—e.g., the proportional relationship of the Laon tower—while simultaneously transmitting the individuality of the building in an instantly recognizable way. We might imagine that this type of blended imagery would be particularly well suited to a bishop or chapter looking to embark on a major construction project, such as Barnes has proposed.[50] Whether or not Villard was working on behalf of the Cambrai ecclesiastics, this type of well-educated, architecturally invested, but ultimately nonexpert audience parallels the hybridity of Villard's drawings.

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48 An exception to this trend is Wirth, *Villard de Honnecourt*.

49 George Brooks, "Villard de Honnecourt: Gothic Carpenter" in this same volume.

50 Carl Barnes, "An Essay on Villard de Honnecourt and Cambrai Cathedral," in this same volume.

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CHAPTER 5

Further beyond Villard: The Rose Window Design at Saint-Quentin

Ellen M. Shortell

The chevet chapels of the former collegiate church of Saint-Quentin in Picardy contain several incised designs created during the building's construction in the early 13th century.[1] They include two unusual small-scale designs for a rose window and a polylobed oculus, carved into the stone in low relief (Figures 5.1 and 5.6). The significance of these reliefs has been subsumed within arguments for and against Villard de Honnecourt's participation in the church's design, as scholars spun out hypothetical scenarios to prove that Villard either did or did not create the reliefs. The attribution to Villard can no longer be taken seriously, but the drawings deserve consideration, as they offer insights into the working process of rose window design and the transmission of design ideas.

In a 2005 article entitled "Beyond Villard: Architectural Drawings at Saint-Quentin and Gothic Design," I described each of the tracings in the chapels and considered their functions in the construction process. In addition to the rose designs, there are full-scale tracings to create templates for the choir piers and for voussoirs, as well as a small, double-centered spiral, sometimes referred to as an "Archimedean" spiral.[2] All of these are linear drawings, incised

1 This essay is dedicated to the memory of Carl Barnes. Carl and I had much to discuss about Villard, Soissons, and Saint-Quentin, and I greatly appreciated his support. Our one, very friendly, disagreement was over the authenticity of the rose window design at Saint-Quentin. Sadly, we were never able to have that discussion on site in Saint-Quentin, and I am far from happy to have the last word. My frustration at never resolving the dispute has made me continue to think about it, and this article is the result of those reflections. Whether my new arguments would have swayed him will have to remain, like so much about Villard, forever unknown. However, I will always thank Carl for keeping me thinking. The original version of this essay was published as "Beyond Villard: Architectural Drawings at Saint-Quentin and Gothic Design," *AVISTA Forum Journal* 15, no. 1 (Fall 2005): 18–29.

2 The pier template was first identified by Branner, "An Unknown Gothic (?) Drawing"; the radial voussoir lines by Bechmann, "Le trait retrouvé"; and the spiral was my discovery, first published in "Beyond Villard." Similar spirals have been found in other buildings from around 1200, and termed "archimedean," for example, by Branner, "Villard de Honnecoourt, Archimedes, and Chartres." This term can be misleading. Archimedes analyzed the properties of a spiral that opens at a steady rate from one center; the double-centered spiral plots the

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with a sharp instrument, with the aid of a straightedge and compass—a technique commonly found in both full-sized on-site construction drawings and in small-scale working drawings and concept sketches on the walls and floors of medieval buildings.[3] Counterparts to each of these have been found and studied elsewhere. The rose and oculus, on the other hand, are modeled in shallow relief in a less commonly found technique.

Drawings that are similar to each of the wall tracings at Saint-Quentin can be found in the Portfolio of Villard de Honnecourt (BnF fr 19093). As I have argued elsewhere, however, they reflect common building techniques of the early 13th century, and prove absolutely nothing about Villard's presence in Saint-Quentin, or his profession. My earlier title, "Beyond Villard," was meant to emphasize the importance of looking beyond the unanswerable questions about Villard's identity and biography, which had complicated the study of Saint-Quentin in particular, to understand the wall drawings in the context of 13th-century building practices. I propose to go further "beyond Villard" here by extending my observations on the rose and oculus as examples of steps in the design of rose window tracery. First, a brief review of the arguments about the attribution of Saint-Quentin to Villard, in which the rose plays a central role, will provide a historiographical background for the evaluation of the drawings.

1 Saint-Quentin and Villard de Honnecourt: Untangling the Historiography

The rose window relief (Figure 5.1) was discovered and attributed to Villard de Honnecourt in the early 1860s by Pierre Bénard, architect in charge of restorations at Saint-Quentin.[4] The first facsimile of Villard's Portfolio had been published by Jean-Baptiste-Antoine Lassus in 1858, just a few years earlier, and Villard was championed as a pioneering architect by those who advocated for

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mathematical relationships marked out by such a spiral, which Archimedes calculated and described in *On Spirals*, written about 225 BCE. See Netz, *The Works of Archimedes*.

3 Schöller, "Le dessin d'architecture," 227–28; Branner, "Villard de Honnecourt, Reims, and the Origin of Gothic Architectural Drawing," esp. 132–34. Both the rose design and pier section were included in the catalogue of architectural tracings by Schöller, "Ritzzeichnungen," 58.

4 Pierre Bénard, "Recherches sur la patrie et les travaux de Villard de Honnecourt," *Travaux de la Société Académique des sciences, arts, et belles lettres de Saint-Quentin* 13 (3rd ser. 6) (1864–66), 260–80. François Bucher, "A Rediscovered Tracing by Villard de Honnecourt," *Art Bulletin* 59 (1977), 315, referred incorrectly to "Paul Bénard," and others have sometimes repeated his error; the architect-in-chief at Saint-Quentin, however, was named Pierre.

Gothic architecture as the quintessential French historical style.[5] The partisans of Gothic hoped to identify a building that could be attributed to Villard.[6] From drawings and textual references in the Portfolio, it was surmised that Villard had been responsible for the abbey church of Vaucelles and Cambrai Cathedral, both a short distance from Villard's presumed birthplace of Honnecourt-sur-Escaut.[7] But both Vaucelles and Cambrai had been destroyed. Beginning with his discovery of the rose, Bénard developed the hypothesis that Villard had designed Saint-Quentin, a major monument that was still standing, also not far from Honnecourt. In short, he found just what everyone was looking for. The fault of this attribution lies in Bénard's overdetermined interpretation of the evidence. At its core, however, are some interesting observations.

To Bénard, who knew no other small-scale architectural tracings, the rose relief bore a striking resemblance to Villard's drawing identified as "a window in the temple of St. Mary in Chartres," on folio 15v of the Portfolio (Figure 5.2), generally agreed to represent the western rose of Chartres Cathedral, albeit significantly altered in composition (Figure 5.3).[8] Although he described them as identical in plan and composition, differing only in the details, he did acknowledge that the design at Saint-Quentin was closer to the actual west rose of Chartres than Villard's drawing was to either, illustrating the differences with a series of drawings (Figure 5.4).[9] All three designs have 12 columns radiating from a central oculus, arches tying the columns together, and 12 oculi in an outer ring beyond the columns. However, the relative sizes and placement of the openings in Villard's drawing differ from the others (Figure 5.4c). Most strikingly, the centers of the outer oculi in the latter drawing lie along the

5 Jean-Baptiste-Antoine Lassus, *Album de Villard de Honnecourt: Architecte du XIIIe siècle, manuscrit publié en facsimile* (Paris, 1858).

6 For early commentary, see especially Jules Quicherat, "Notice sur l'album de Villard de Honnecourt, architecte du XIIIe siècle," *Revue archéologique*, 1st ser., 6 (1849): 65–80, 290–26, and pls. 116–18; and Eugène-Emmanuel Viollet-le-Duc, "Première Apparition de Villard de Honnecourt, architecte du XIIIe siècle," *Gazette des Beaux-arts*, 1st ser. 1 (1859): 286–95. Nicholas Roquet, "Second Life: Identification, Parody, and Persona in William Burges's "Vellum Sketchbook," in *Chora* 6: *Intervals in the Philosophy of Architecture*, ed. Alberto Pérez-Gómez and Stephen Parcell (Montréal, 2011), 249–74, esp. 251–53, most recently looks at the 19th-century reaction to Villard.

7 Lassus, *Album de Villard de Honnecourt*, xvii. Cambrai is approximately 15 km (9 miles) and Vaucelles 4.5 km (less than 3 miles) north of Honnecourt. Saint-Quentin is about 22 km or 13 miles south.

8 Bechmann, *La pensée technique*, 123–27, leaves room for some doubt.

9 "Le plan et la composition de ces trois roses sont identiques … La différence entre l'original et les deux copies consiste uniquement dans les détails." Bénard, "Recherches sur la patrie et les travaux de Villard de Honnecourt," 271.

FIGURE 5.1 Saint-Quentin, former collegiate church, bas-relief model of a rose window, 13th *c*.
PHOTO: AUTHOR

center lines of the arches rather than the columns, which moves them further out from the center; they are proportionately larger—equal in diameter to the central opening—and have 12 lobes rather than the eight at Chartres and Saint-Quentin. Villard also filled the spandrels between the arches with quatrefoil openings. If constructed, this drawing would produce a rose with more complex, lighter stonework, consistent with rose windows built a decade or more after the west rose of Chartres.[10]

10 Bucher, "A Rediscovered Tracing," 317.

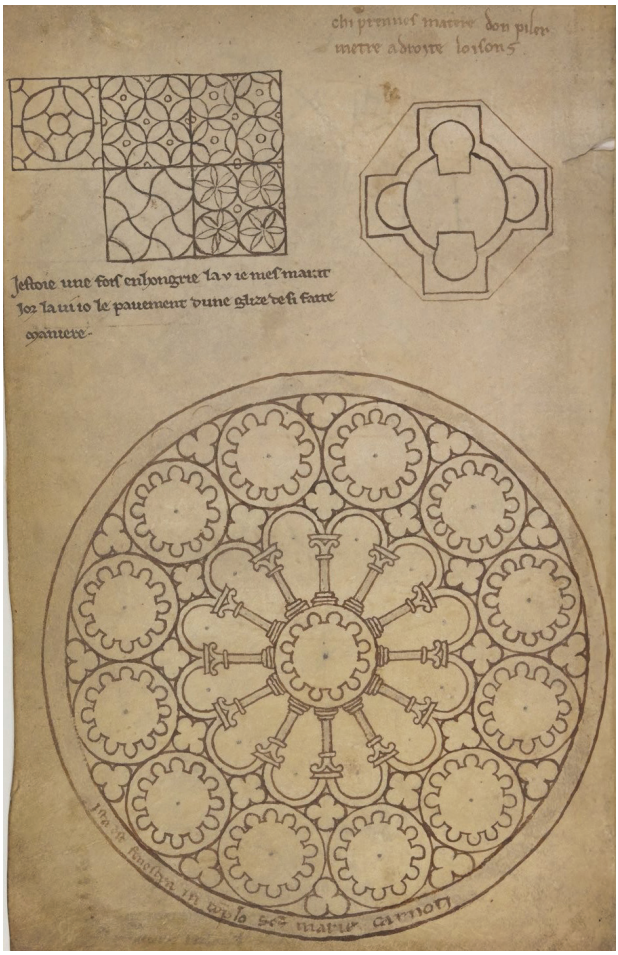

FIGURE 5.2 Portfolio of Villard de Honnecourt, fol. 15v: west rose window of Chartres, tile pavement patterns, and section of a pilier cantonné (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

Noting these differences, Bénard suggested that the Saint-Quentin rose was an intermediary between the actual rose of Chartres and Villard's drawing, yet he stated that the author of the Saint-Quentin design must have had Villard's drawing in hand as a model when the relief was carved.[11] As has been noted

11 Bénard, "Recherches," 271–72.

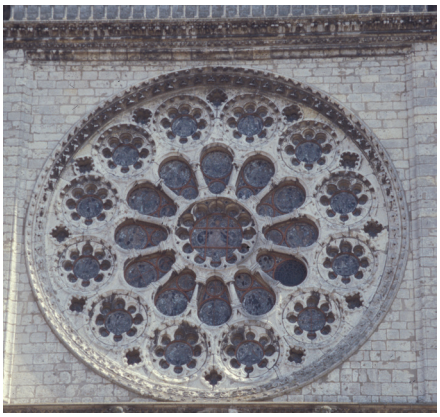

FIGURE 5.3
Chartres. Cathedral of Notre-Dame: west façade, rose window
PHOTO: AUTHOR

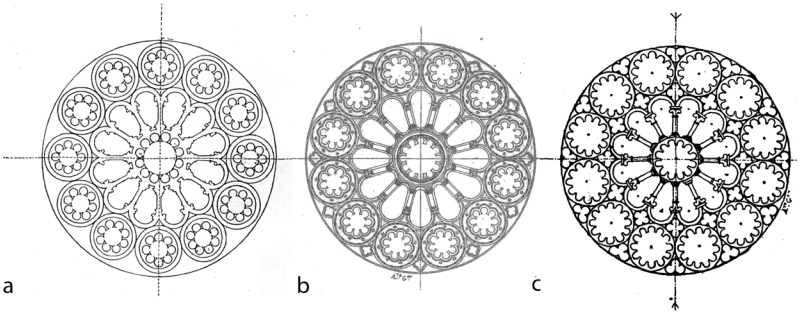

FIGURE 5.4 Pierre Bénard's illustrations: a. Reconstruction of the rose window design at Saint-Quentin; b. West rose window of Chartres Cathedral; c. Villard de Honnecourt's drawing of the west rose of Chartres Cathedral (Paris, Bibliothèque nationale de France, MS fr. 19093, fol. 15v)
MONTAGE BY AUTHOR AFTER P. BÉNARD

before, this theory makes no sense. If the purpose of Villard's drawing were to reproduce the Chartrain rose elsewhere, why would he have drawn an altered version of the rose at Chartres, taken the drawing to Saint-Quentin, and then created a design that looked more like the unaltered original, all the while looking at his drawing?[12] The discovery of the relief design was remarkable, but the explanation required further investigation.

Bénard's argument included two other elements. On the page that includes the west rose of Chartres, Villard drew patterns for floor tiles that are strikingly similar to those in the St. Michael Chapel above the western entrance to

12 Carl F. Barnes, Jr., *The Portfolio of Villard de Honnecourt: A New Critical Facsimile in Color* (Farnham, 2009), 225–26 also summarizes the argument that I made in 2005 and earlier.

Saint-Quentin (Figure 5.5). To Bénard, this seemed too much of a coincidence to be accidental. To strengthen his thesis, he compared modern drawings of the elevations of Reims Cathedral and Saint-Quentin, to show that Villard's study of Reims Cathedral influenced his design for Saint-Quentin. Bénard then embellished the hypothetical narrative of Villard's life based on his new evidence. He posited that Villard had been hired to build a new church, not at Cambrai as had been argued, but at Saint-Quentin.[13] In the prevailing historical model of the time, which aimed to place buildings along a line of stylistic development, there were no evident architectural "offspring" for Saint-Quentin.[14] Thus, Bénard reasoned, Saint-Quentin was Villard's only commission. Having received the commission, he traveled to learn about the latest, most interesting methods and motifs before beginning his design, and returned with drawings.[15] This would explain the absence of any drawings of Saint-Quentin in his "croquis de voyage," but it also means that construction at Saint-Quentin must have started no earlier than 1220, after the completion of the western towers of Laon and the nave walls of Reims, which are depicted among his drawings. This is about 30 years later than the architectural fabric, stained glass, and surviving documents for Saint-Quentin suggest.[16]

For more than a century, Villard's purported role as master mason nonetheless remained a primary focus of architectural historians' interest in Saint-Quentin. Hans Hahnloser, Paul Frankl, François Bucher, and for a time, Pierre Héliot, all accepted the idea that Villard de Honnecourt, architect, had played some role in the building's design.[17] The discrepancy in dates suggested

13 Bénard, "Recherches sur la patrie et les travaux de Villard de Honnecourt."

14 This idea is still evident in Dieter Kimpel and Robert Suckale's *Gotische Architektur in Frankreich*, 350, where Saint-Quentin is placed in the category of "Picard Rayonnant?" with Beauvais Cathedral and described as "a singular epigon with no progeny."

15 "un simple carnet de notes et de croquis de voyages, un portefeuille de renseignements recueillis jour par jour … il les accumule pour son propre usage …" Bénard, "Recherches," 266.

16 Shortell, "Saint-Quentin, Chartres, and the Narrative of French Gothic"; Shortell, "Beyond Villard," 21–24; Mathieu Tricoit, "La collégiale de Saint-Quentin (Aisne) et sa place dans le paysage architectural du XIIIe siècle," PhD diss., Université de Picardie, Lille, 2011, also supports this conclusion. Carl Barnes, whose earliest work was on the architecture of the Cathedral of Soissons, was also supportive of this dating, which revises his earlier hypothesis that Soissons was the first follower of Chartres.

17 Hans Hahnloser, *Villard de Honnecourt: Kritische Gesamtausgabe des Bauhüttenbuches* (Vienna, 1935), 236–37. Pierre Héliot, "Chronologie de la basilique de Saint-Quentin," *Bulletin monumental* 117 (1959), 50, names Villard master of the choir. By 1967, he was more equivocal, but still left open the possibility that he was the second master who built the upper stories of the choir, in Héliot, *La Basilique de Saint-Quentin et l'architecture du moyen âge* (Paris, 1967), 41 and 61–64. Paul Frankl, *The Gothic: Literary Sources and Interpretations through Eight Centuries* (Princeton, 1960), 36, says of Villard that "… it is

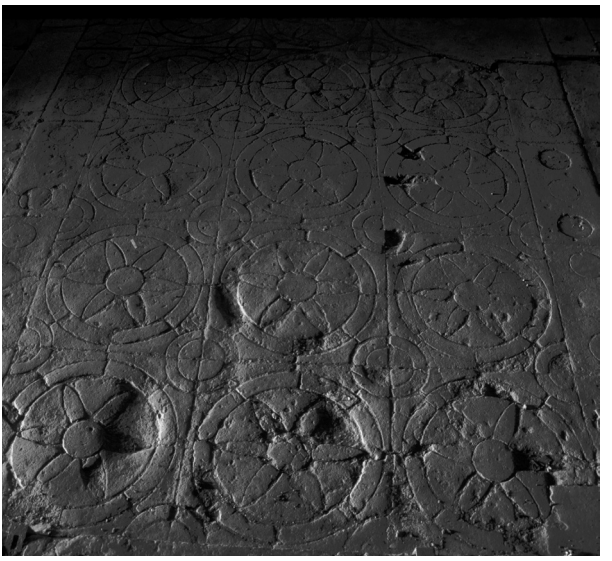

FIGURE 5.5 Saint-Quentin, Collegiate Church: floor tiles in the Saint Michael Chapel, *c.*1190
PHOTO: AUTHOR

by the built forms of Saint-Quentin and Villard's hypothetical biography led some to argue that the building was a deliberate hybrid, consciously conceived to combine visual quotations from a number of other buildings.[18] This fanciful idea accorded well with the notion that Villard's Portfolio was a kind of model book, from which a master might pick and choose different elements. Pierre Héliot, who carried out the most sustained study of the building after Bénard, suggested the more credible but still entirely speculative alternative thesis that Villard had arrived around 1220, and might have contributed something to the choir, where construction was already well underway.[19]

Without wanting to further belabor this review of Bénard's thesis, I would make two observations before turning to the rose designs. First, while there are certainly elements of the choirs of Reims and Saint-Quentin that bear comparison, close study of the building fabrics reveals both comparison and contrast in certain details and suggests that those who worked at these sites did share knowledge and practices. Bénard's argument centers not on close

probable that he drew the plans for the Collegiate Church of St.-Quentin". François Bucher, "A Rediscovered Tracing by Villard de Honnecourt," *Art Bulletin* 59 (1977), 315–19, specifically addresses the rose engraving as evidence for Villard's authorship.

18 Bony 1957–58, 35–52 and *French Gothic Architecture*, 280–81; Kimpel and Suckale 1985, 350.

19 Héliot, "Chronology de la basilique," and idem, *La basilique de Saint-Quentin*, 61–66.

examination, however, but on general proportions and an overall impression. In any case, it is quite clear now that the ground plan of Saint-Quentin was laid out shortly before that of Reims, and that neither building proceeded quickly enough to have provided a complete model for the other.

Secondly, the pavement type found in the St. Michael chapel of Saint-Quentin, completed by 1190, was ubiquitous in the decades around 1200. Composed of colored ceramic tiles arranged in geometric patterns, similar pavements survive in Cistercian monasteries from Yorkshire to Hungary as well as in secular churches like Saint-Quentin, and many more must have been destroyed without being documented.[20] László Gerevich attributed the Cistercian abbey church of Pilis in Hungary to Villard on the basis of the patterns of floor tiles excavated in its transept, but notes that these patterns were also found in early medieval textiles and in Roman mosaics, which served as inspiration for medieval pavement designs.[21] The complicated six-petaled pattern found at Saint-Quentin, but not at Pilis, seemed particularly convincing to Bénard and later to François Bucher. It may have been less common, but it is hardly unique, and the form itself, created with interlocking circles, was ancient and widely known in all of these media.[22]

It has been generally accepted that Villard drew the pavement in Hungary, but in fact this is not what he wrote. His text says that he saw a pavement "made in this manner" when he was in Hungary.[23] It seems equally likely to me that on seeing such a pavement elsewhere, he drew it because it reminded him of one he had seen in Hungary. In either case, the fact that he found this common type of pavement remarkable seems to further reduce the likelihood that Villard was ever in charge of a construction site. Without additional evidence, nothing but coincidence connects either of the drawings on folio 15v to Saint-Quentin.

2 Character and Authenticity of the Reliefs

Bénard's discoveries do not lead inevitably to Villard, nor to the agency of any one artist or mason, but the reliefs created by an unknown artisan remain of interest. Despite general acceptance of Bénard's conclusions and his rather spectacular discovery, there was no scholarly investigation of the rose relief for

20 Shortell, "The Western Tower," 152–54.

21 Gerevich, "Pilis Abbey," 183–93 and "Les fouilles," 392–93.

22 The motif is also found in the pavement of Byland Abbey, for example.

23 Barnes, *Portfolio of Villard de Honnecourt*, 98.

over a century after its publication. Henri Deneux concluded in 1925 that the relief must have been destroyed, and Hahnloser and Héliot both accepted that conclusion.[24] This is at least partly Bénard's fault, since his confusing description of the rose's location "in an apsidial chapel" sent 20th-century researchers looking at the wrong walls.[25] The rose design is actually found in the chapel in the north arm of the eastern transept, which is, furthermore, a place that receives very little light, so that one has to look quite carefully. The failure of 20th-century researchers to find it can be attributed to these conditions as well as the tremendous damage the church suffered in the First World War. Repairs were still underway at the outbreak of the Second World War, making study in that era difficult. Debris, building materials, and temporary walls blocked off parts of the church well into the 1950s. Thus, this purported work of Villard remained hidden and attained a kind of mythical, even apocryphal, status until the 1970s.

It was only in the late 1970s that François Bucher found the relief, which he considered evidence to reaffirm the possibility that Villard had visited Saint-Quentin and had contributed in some way to the design of the collegiate church.[26] Bucher, like Bénard before him, used the drawings to construct a more extensive biography of Villard.[27] By this time, however, Robert Branner and Carl Barnes had begun to challenge the long-accepted idea that Villard was an architect.[28] Having previously searched and found the design for a pier in the place they expected to find the rose, Branner and Barnes were skeptical of Bénard's attribution and Bucher's discovery. Following Bucher's publication of the drawing, they returned to Saint-Quentin to see it for themselves, and promptly declared it a forgery.[29] Unfortunately, this tended to discourage study

24 Deneux, "Signes lapidaires"; Hahnloser, *Villard de Honnecourt*; Héliot, *La Basilique de Saint-Quentin*, 41.

25 Carl Barnes's postscript to Branner, "An Unknown Gothic (?) Drawing," 152, describes the situation. He elaborates further in *The Portfolio of Villard de Honnecourt*, 225.

26 Bucher, "A Rediscovered Tracing" and "Letter to the Editor."

27 Bucher, *Architector*, 15–34.

28 Branner, "Gothic Architecture," 331, wondered whether Villard was really an architect, or just "a lodge clerk with a flair for drawing." Barnes, "Letter to the Editor," supported his doubts about Villard's profession, which he later developed in "Le 'problème' Villard de Honnecourt." Jean Wirth, *Villard de Honnecourt: Architecte du XIIIe siècle*, 10, sums up the impact of Barnes's scholarship, describing the reception of Barnes's conclusions as "accepted dogma."

29 Branner, in the company of his then-student Carl Barnes, found the pier template in 1956, but his findings were only published posthumously; see Branner, "An Unknown Gothic (?) Drawing." The charge of forgery was first described by Barnes, "Letter to the Editor," *Art Bulletin*, in response to Bucher's article, "A Rediscovered Tracing," and elaborated more

of the rose relief, which was next mentioned in print by Wolfgang Schöller in 1989; Schöller accepted it as a medieval work without qualification.[30] Neither Branner nor Barnes explained their judgment in detail, but rather developed an alternative explanation for the existence of the relief, based on skepticism about Bénard's "hidden agenda" to enhance his own position and obtain more funding and authorization for restoration work.[31]

Bénard described his discovery as follows:

> Recently, in one of the apsidial chapels of the church of Saint-Quentin, while dismantling a wooden altar, … the dimensions of which hid the bays behind it, we had the good fortune to discover … a drawing that immediately drew our attention. Although damaged long ago by masons who cut deeply into the wall to force the square retable of the altar into the polygonal contours of the chapel, it is well enough preserved to allow us to reconstruct the full composition.[32]

The relief is very much as described. Carved in low relief into the wall, starting about 80 cm above the chapel floor, the image of a rose window is unmistakable (Figure 5.1).[33] The wall appears to have been struck with a heavy mallet at some time after the design was completed, seriously damaging part of the carving. The wall surface has subsequently suffered from moisture and deterioration over time as well. Bénard's assumption that the primary damage was done in the process of installing a new altar seems entirely credible.

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fully in *The Portfolio of Villard de Honnecourt*, 224–26. In conversation, Barnes told me that this was also Branner's opinion.

30 Schöller, "Ritzzeichnungen," 58.

31 I tried to draw Dr. Barnes out on this topic several times, to no avail, although he admitted that my arguments were logical and well reasoned. In an e-mail following the publication of "Beyond Villard," he agreed that it "may put an end to the debate for most people but I still believe it is a Bénard forgery."

32 Bénard, "Recherches sur les Travaux," 267–70: "En faisaant déposer, il y a quelques temps, dans une des chapelles absidales de cette église de Saint-Quentin, un autel, … don't les dimensions encombrantes masquaient les baies circonvoisines, nous avons eu le bonheur de découvrir, sur … la partie inférieure des murs, à hauteur d'homme, un dessin qui frappa vivement notre attention. Ce dessin, bien qu'endommagé jadis par les maçons qui avaient profondément entaillé la muraille pour faire de force le rétable carré de cet autel dans le contour polygonal de la chapelle, est encore assez bien conservé pour qu'il nous ait été facil e'en restituer la compoosition intégrale."

33 Another drawing, in the first radiating chapel on the north, has been mistaken for Bénard's rose. However, as Robert Branner recognized, this drawing is a template for a choir pier. It is also significantly larger and higher on the wall than the rose. Branner, "An Unknown Gothic (?) Drawing."

Carl Barnes, on the other hand, found it an impossible coincidence that the architect who had devoted years of work to the conservation of the underappreciated collegiate church had found a direct connection there to two drawings on the same page of Villard's work. Barnes's alternative, however, requires Bénard to have carved into the wall an image that perfectly replicated neither the west rose of Chartres nor Villard's drawing of it, claim that it *was* a perfect copy of Villard's drawing, and then taken a sledgehammer to his own work.[34] This seems quite unlikely. Absent other evidence to suggest they are 19th-century creations, then, I must continue to disagree, with all due respect and affection, with Carl Barnes.

Strengthening the argument for the authenticity of the rose design is a second relief of a 12-lobed oculus, lower on the wall to the right, carved in a similar manner (Figure 5.6). First published by Roland Bechmann in 1991, neither Bénard, Bucher, Branner, nor Barnes seems to have noticed it.[35] It appears to be another, unfinished attempt to draw the same rose; it is larger but otherwise nearly identical to the center oculus of the relief of the full rose.

There was until recently a protective frame of wood strapping nailed into the stone around the rose relief, placed there at some time after Bénard's discovery. The surface has been coated with an unknown, waxy substance that has yellowed, and the wall has been refaced in places.[36] Examining the

FIGURE 5.6 Saint-Quentin, Collegiate Church: relief carving of a tracery rosette
PHOTO: B. DELAIRE

34 Barnes, "Portfolio," 224–26.
35 Bechmann, *Villard de Honnecourt et la pensée technique*, 130.
36 Bechmann, *Villard de Honnecourt et la pensée technique*, 128 and n. 57.

deteriorated stone in this very dark space, François Bucher mistakenly saw a rectangle of plaster in the frame and referenced the tracing floors at Wells and York Cathedrals.[37] The Saint-Quentin reliefs, however, are carved directly into the limestone of the chapel wall.

Since Bénard's time, numerous linear tracings have been discovered on the floors and walls of medieval buildings. Full-scale designs on walls, like the pier tracing and voussoir layouts found at Saint-Quentin, could be used to create the templates that guided stonecutters, while guidelines for full windows and doors, such as those in the crypt of Bourges Cathedral or the terraces of Clermont, allowed builders to lay out cut stones before assembling them.[38] Others seem to work out design concepts, on both full and small scales.[39] Any of these might be used in the design of the same building, and sometimes existed alongside drawings on parchment. Comparisons of drawings to completed buildings often reveal large and small differences that demonstrate a creative process of continual revision.[40] The Saint-Quentin reliefs are surely part of such a process.

A number of other small-scale tracings for the designs of rose windows are known, including two at the Cathedral of Soissons, which was under construction at the same time, about 60 km south of Saint-Quentin.[41] These tracings consist of circles and radial lines set out with a straightedge and compass, and reveal the geometric process of developing a rose window design. The reliefs at Saint-Quentin were clearly started with the same process, as traces of constructional radii are still visible in both examples. However, the Saint-Quentin designs were further elaborated to represent details of the tracery of a finished rose. The voids within the oculi and between the columns have been cut away, and in the larger, more complete rose, the capitals and bases of the columns that radiate from the center are clearly delineated (Figure 5.7). The reliefs are best described as representations of roses. One can imagine that such an image could have been created to present the builder's intention to a patron,

37 Bucher, "A Rediscovered Tracing," 315–17.

38 Schöller, "Ritzzeizeichnungen"; Davis, "On the Drawing Board," 185–86; Pastan, "Regarding the Early Rose Window," 271.

39 Schöller, "Eine mittelalterliche Architekturzeichnung," 196–98.

40 Bork, *Geometry of Creation*, 22. Davis, "Guidelines," 173–79.

41 Schöller, "Le dessin d'architecture à l'époque gothique," in *Les Bâtisseurs des cathédrales gothiques*, ed. R. Recht (Strasbourg, 1989), 228–30; idem, "Ritzzeichnungen. Ein Beitrag zur Geschichteder Architekturzeichnung im Mittelalter," *Architectura* 19 (1989), 36–61, esp. 58–59; Dany Sandron, *La cathédrale de Soissons: Architecture de pouvoir* (Paris, 1998), 173–74.

FIGURE 5.7 Saint-Quentin, Collegiate Church: relief carving of a rose window design, detail
PHOTO: AUTHOR

to explain the idea to masons on the site, or perhaps to serve as a guide before creating full-scale templates.

One factor behind the skepticism about the authenticity of these designs may well have been that no other examples of the type were known. At Saint-Ouen of Rouen, the tomb of Master Alexandre Berneval (d. 1441) depicts him holding in one hand a drawing or model of a segment of the south transept rose of the abbey church (Figure 5.8). In the other hand, he holds dividers or a compass, and appears to measure out part of the rose. As at Saint-Quentin, the voids in the tracery that would hold glass are carved out in shallow relief. The image suggests a design practice that might have been common, but we can make only so much of an image created more than 200 years later than that at Saint-Quentin and serving as an attribute by which to remember the master. Nor can we take the scale of the relief or the compass as anything more than suggestive.[42]

42 Wu, "Hugues de Libergier."

FIGURE 5.8 Rouen, Abbey Church of Saint-Ouen: Tomb of Master Alexandre Berneval, *c.*1441
PHOTO: ©BERTRAND RIEGER

A later 13th-century tracing from León Cathedral in Spain, however, provides a closer comparison to the reliefs at Saint-Quentin (Figure 5.9).[43] An image of the rose window in the cathedral's north transept, completed in 1285, is carved into a stone slab now displayed in the cloister. Traces of radial lines and compass points used in the drawing process are still visible, but while the openings in the tracery are not voided to create a relief like the Saint-Quentin design, it is also a more complete image rather than a schematic. It is believed to have been created in the process of designing the rose in the last third of the 13th century. At 326 mm in diameter, it is about half the size of the Saint-Quentin design. It has been proposed but not proven that it was created by a French artisan; certainly the cathedral drew inspiration from the Cathedral of Reims and other French monuments, a connection that at least draws it closer to the architectural production of the previous century that included Saint-Quentin.[44] An inscription on the stone slab that bears the design reveals that it was part of a tomb from the Romanesque cathedral, taken up during the Gothic building

43 Robert Bork first called this to my attention. I am grateful to Therese Martin, who generously shared her knowledge and put me in touch with colleagues in Spain.

44 The fact that its diameter is equivalent to a foot in use in France at that time led Manuel Valdés Fernándes in *Una historia arquitectónica*, 1994, to speculate that the artist who created it came from France. However, the difference between the French and Spanish foot is only 2 mm, making this a plausible theory, but hardly a proven one. See also Karge, "La arquitectura de la catedral de León"; Herráez Ortega, "La construcción del templo gótico;" Sandron, *La cathédrale de Soissons*, 228 and 236 n. 1042.

FIGURE 5.9 Relief carving of the design of the north rose of León Cathedral, Spain, *c.*1280
PHOTO: ARCHIVO DE LA CATÉDRALE DE LEÓN

campaign, and placed in a new wall in the transept at some time after the rose was completed and the drawing no longer needed.[45] The purpose of this carved image is attested by the fact that it is quite faithfully reproduced in the existing north rose of León. The same cannot be said for the reliefs at Saint-Quentin.

3 Context and Purpose: The Northeast Transept Façade[46]

The location of the reliefs in the northeast transept chapel of Saint-Quentin suggests that they were most likely part of the planning process for the

45 Martin, "Dibuxo dun rosetón"; Jiménez Martín, "Diseño del rosetón."

46 Saint-Quentin is unusual among French Gothic churches in having two transepts. For clarity, I refer to the two arms of the eastern transept here as the northeast and southeast transepts.

northeast transept façade, but the circular opening of the rose is now filled with flamboyant tracery installed in the 15th century. No evidence of the original rose tracery survives. The rest of the façade, however, accords with the style of the early 13th century. The lower story, with two undivided lancet windows piercing a heavy wall, belongs to the earliest phase of construction of the eastern part of the church, built between about 1190 and 1205, and suggests an initial plan for a quite solid design. It appears that the disproportionately tall clerestory of the choir is the result of a change in design.[47] The crossing piers also suggest that the original designer may have envisioned something more modest in scale; they are essentially *piliers cantonnés* with *en délit* colonettes between the coursed shafts, their cores only 1.67 m in diameter, far too slender to support the inward thrust of the existing upper walls. This is evident today in the deformation and cracking of the triforium and in the reinforcement of the main arcade in the bays closest to the crossing, part of an early 14th-century intervention. In the 15th century, the corresponding south arm, which was presumably symmetrical with the north, was supported by wooden trusses until the failing crossing piers were replaced with much larger ones. In 1477, Master Collaert Noel, who rebuilt the piers, was asked to replace the tracery of the south transept's rose window to harmonize with the rose on the north side, which must have been replaced shortly before.[48]

With the exception of the flamboyant rose tracery, the rest of the upper story of the northeast façade retains its original composition. Three narrow lancets, separated by slender mullions, are tied together in one composition with the rose; the corners below the rose are voided and divided into a series of small cusped arches, and the spandrels between the lancet arches are pierced with small quatrefoil oculi (Figure 5.10). The general arrangement is quite familiar in 13th-century Gothic façades, most notably the eastern wall of Laon Cathedral, completed around 1220, and even the west façade of Chartres, where the triple lancets of the 12th-century façade became part of a new composition with a rose window. However, the northeast transept façade at Saint-Quentin bears the closest comparison with the north transept façade of Chartres Cathedral, completed in about 1230–31 (Figure 5.11). The composition at Chartres has five rather than three lancets, and the Saint-Quentin rose is much smaller—only about 7 m in diameter as opposed to 10.15 at Chartres—but there are otherwise unique parallels. Not only are the enframing arches above the two roses quite similar in form, structure, and decoration, but the oculi set in the spandrels

47 Héliot, 41 and 60–66. In addition to differences in style between the lower and upper stories, modifications to the buttress supports at the base of the hemicycle clerestory suggest a change in plan as well.

48 Laon, Archives départementales de l'Aisne, Inventory G 784, 659–63.

between the lancets, as well as small cusped lancets that fill the corners of the square frame below the rose, are, to my knowledge, found in only these two places.

A group of windows in the hemicycle clerestory at Saint-Quentin, adjacent to the eastern transept, has been dated to about 1230; the tracery and glass, then, both suggest either slow construction or a hiatus between the lower and upper stories of the chevet and eastern transept, which is consistent with the different treatment of the lower and upper walls. While the relief designs at Saint-Quentin compare to the earlier west rose of Chartres, then, the completed wall suggests that a lighter rose of bar tracery was finally constructed there around 1230. It seems logical that the relief drawings represent an early design phase of the north transept façade, replaced by something more advanced when it came time to construct it. There is no certainty, however, that this was the case. Did the master of Saint-Quentin really intend to build a replica of the Chartrain rose? Might the drawing have been created simply to show colleagues a new style of rose? The reason for recreating something

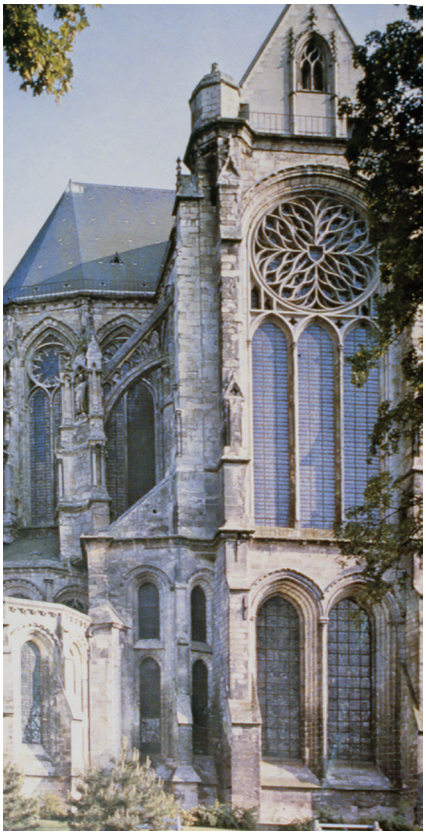

FIGURE 5.10
Saint-Quentin, Collegiate Church: northeast transept façade, exterior
PHOTO: AUTHOR

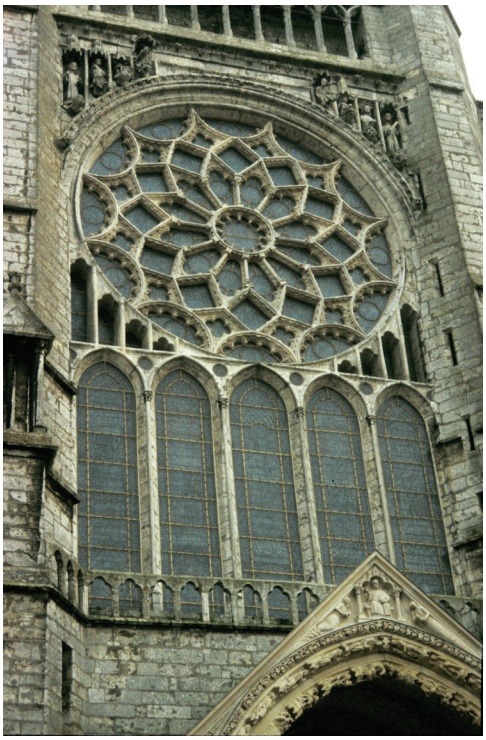

FIGURE 5.11
Chartres, Cathedral of Notre-Dame: north transept rose
PHOTO: AUTHOR

so similar to the west rose of Chartres at Saint-Quentin remains unresolved. A related tracing in Soissons Cathedral suggests the relationship between the designs may not be as straightforward as has previously been assumed.

4 The West Rose of Chartres and Rose Window Designs at Saint-Quentin and Soissons

There are two geometric tracings for rose window designs at Soissons Cathedral. One is found on a wall of the ground-level chapel that opens from the south transept, and depicts a central circle surrounded by a ring of eight circles, which has been compared to the north rose window of Laon Cathedral.[49] The other is at tribune level on the eastern wall of the south transept as

49 Klein, *St. Yved in Braine*, 68–74, cited by Schöller, "Le dessin d'architecture à l'époque gothique," 228–30.

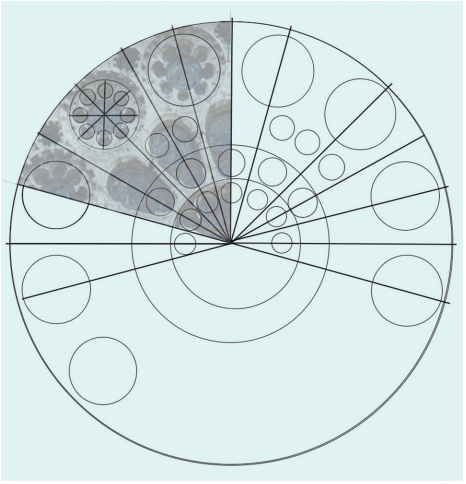

FIGURE 5.12
Section of the west rose of Chartres superimposed over the geometric scheme for a rose window (rotated), Soissons Cathedral
AUTHOR AFTER WOLFGANG SCHÖLLER

it joins with the choir aisle.[50] As Wolfgang Schöller has shown, it reproduces the geometric matrix of the west rose of Chartres Cathedral (Figure 5.12).[51] Neither of these tracings can be associated with a rose window constructed at Soissons. As with Saint-Quentin, it has been suggested, quite sensibly, that the drawings represent early designs for rose windows that were eventually built quite differently, but there are no further traces of this process that would help to verify that idea.[52]

While both the Saint-Quentin relief and the second tracing at Soissons compare closely to the west rose of Chartres as built, there are slight differences from the actual rose that both drawings share.[53] Schöller noted a difference in the alignment of the outer oculi between the Chartrain rose and the tracing at Soissons. At Chartres, the eight-lobed outer oculi are arranged so that vertical and horizontal diameter lines pass through the centerpoints of two opposite lobes; in other words, their main axes are parallel to the enframing rectangle of the wall (Figure 5.2). In the Soissons drawing, the centers of the lobes are aligned instead with the axes of the radiating colonettes (Figure 5.12). The same is true at Saint-Quentin (Figures 5.1 and 5.4a). In addition, both the Soissons and Saint-Quentin roses are rotated 15 degrees with respect to

50 This wall is the point of transition from the four-story transept to the taller, three-story central vessel that was begun immediately after the transept's completion, and represents a distinct change in the design of the church. Sandron, *La cathédrale de Soissons*, 79–85.

51 Schöller, "Eine mittelalterliche Architekturzeichnung," 199–202.

52 Schöller, "Eine mittelalterliche Architekturzeichnung," 200–02.

53 This similarity was also noted by Sandron, *La cathédrale de Soissons*, 175–76 and 258.

Chartres, so that oculi are centered on the vertical axis of the rose itself. We might consider these changes insignificant, either a mistaken memory or an experimental modification of the original, if they were not so similar.

Everyone who has written about these drawings, myself included, has assumed that the west rose of Chartres was the point of origin for any drawing that closely resembled it. This should not be a foregone conclusion, however, and comparison of these two drawings raises questions about this chronology. The drawings at Soissons and Saint-Quentin are found on walls that were built between 1190 and 1205, providing an approximate *terminus post quem*. The west rose of Chartres was completed between 1205 and 1210, while comparison to roses created in the next decades suggests it is quite unlikely that a working drawing in this style would have been created after 1215. No relative chronology can be established clearly with the existing evidence.

The precedence of the Chartrain rose over the Soissons tracing was once thought to accord with the architectural precedence of Chartres over Soissons; the person who drew the rose, then, must have come from Chartres and brought a new elevation design for the central vessel as well as knowledge of the west rose's construction.[54] However, more recent research has reversed the chronological relationship between Chartres and Soissons, and it is more likely that the builders of Chartres learned from Soissons.[55] Similarly, it seems equally possible that working designs for rose windows at Soissons and Saint-Quentin could have preceded the construction of the west rose at Chartres.

Schöller believed that the axial orientation of the outer oculi in the drawings was an improvement to the design of the Chartrain rose, resolving a disharmonious visual effect. The north rose of Laon Cathedral, built around 1170–80, clarifies the problem (Figure 5.13). Its outer ring of eight eight-lobed oculi surrounds a larger, eight-lobed central oculus. With the circular opening divided into just eight parts, radial lines through the centers of the lobes of the inner oculus align with those in the outer oculi. At the same time, they also align with vertical and horizontal axes. In other words, in the north rose of Laon, the outer oculi are aligned *both* axially with respect to the center *and* parallel to the enframing rectangle of the wall. Combining this design of eight-lobed oculi with another familiar early rose design, that of a 12-spoked wheel, forced the designer of the Chartrain rose to choose one alignment or the other. Visual tension between the axiality of the rose as a whole and the square setting of the oculi causes an optical illusion so that the oculi appear to move.[56] It is

54 Barnes, *The Cathedral of Chartres and the Architect of Soissons*, 64–74; Schöller, 199.

55 Sandron, *La cathédrale de Soissons*, 163–67.

56 Schöller, 200.

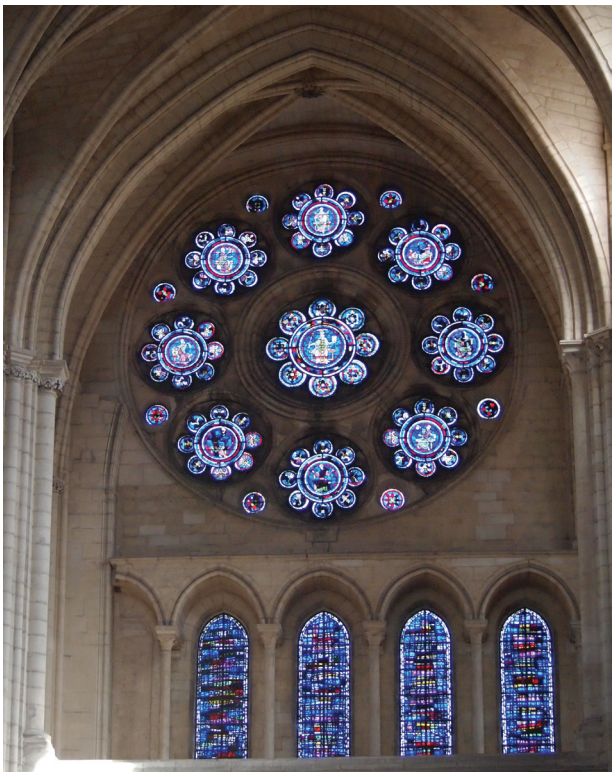

FIGURE 5.13 Laon Cathedral, rose window in north transept
PHOTO: GEORGE BROOKS

impossible to say why the Chartrain rose exhibits a different choice than the two drawings, or when that choice was made. It may be that the Soissons drawing is a correction of Chartres, as Schöller suggested. It is also possible that the arrangement at Soissons and Saint-Quentin was the intended one for Chartres, but that the orientation of the oculi was changed during construction. Or it may simply be that the designer of the rose at Chartres approached the same problem independently with a different result.

Bénard illustrated his comparison of the completed west rose of Chartres, the relief at Saint-Quentin, and Villard's drawing of the rose of Chartres with three line drawings, all of the same size (Figure 5.4). While this highlights his assertions of the similarities in design, it masks the fact that the images reproduce three objects of entirely different scales, media, and dimensionality. The drawings create a false sense of equivalency between a full-scale built structure, a bas relief one-fifteenth its diameter, and an ink drawing on parchment. The rose designs at Soissons and Saint-Quentin are also of different

sizes—approximately 170 cm vs 66 cm in diameter, respectively, and the former consists of sharp, shallow lines rather than the carved shapes of the latter. It is futile to look for an artist's hand in these comparisons, and thus the question of shared authorship must remain open. However, the Cathedral of Soissons and the church of Saint-Quentin share sufficient similarities in decoration and structure, and are close enough geographically as well as chronologically, that some of the same people likely worked at both sites. Both buildings also have artistic connections to Chartres.[57] While the west rose of Chartres drew on existing types of rose windows for its design, it was innovative in bringing the familiar wheel window together with a ring of oculi like the north rose of Laon. It thus seems an impossible coincidence that such similar compositions would be created in three different places independent of one another.

As Roland Bechmann noted, knowledge of the design elements of rose windows had to have circulated from one place to another.[58] For masons who were used to drafting parts of buildings with a compass, square, and straightedge, the basic geometric operations required to create this rose design would be easy to remember and replicate without needing to carry a drawing on parchment from one place to another, as Bénard and several successors imagined. In the case of the three variations on the Chartrain design, one can imagine a variety of scenarios that involve masons discussing possible designs, carrying on the conversation at different worksites, and working the problems out by drawing them on the wall. They might have had it in mind to design a rose for a specific location, such as Chartres, or the discussion might have revolved around a general design problem that could be applied at any of these buildings. Of course, it is also always possible that someone did indeed reproduce the design of the west rose of Chartres at both Soissons and Saint-Quentin, with the same modifications, perhaps as the starting point for another rose window. We simply cannot assume that the wall drawings were meant to communicate the design already in place at Chartres.

5 Conclusion: The Rose Reliefs and Villard's Drawing

Investigations of the rose reliefs at Saint-Quentin began with a comparison to Villard's drawing of the west rose of Chartres, and it is thanks to Pierre Bénard's attribution that the relief was preserved. This comparison, then, deserved

57 These similarities are presented by Shortell, "Saint-Quentin, Chartres, and the Narrative of French Gothic," and "Ambulatories, Arcade Screens, and Visual Experience."

58 Bechmann, *Villard de Honnecourt et la pensée technique*, 124.

another look. Examination of the rose window designs at Saint-Quentin and Soissons have led us away from Villard to questions about the circumstances under which the wall drawings came to be. In their details, we can read the practical considerations of masons regarding the assembly of parts and the placement of different elements. The geometric trace lines at Soissons and those still visible at Saint-Quentin show the designer's process unfolding. Villard, of course, was able to erase the construction lines of his parchment drawing, while a wall tracing does not allow this. His aim seems to be a finished impression of something he observed and interpreted, consciously or unconsciously modifying the model.

Villard seems to have shared with his contemporaries a fascination with rose window design, and no doubt recorded the rose of Chartres, like that of Lausanne on the facing page, folio 16r, because of the originality of their forms. Villard's drawing of the rose of Chartres has been seen as an aspirational interpretation, a draft for a rose that was never built, larger and lighter than the model.[59] Despite his famous misunderstandings of stone construction techniques, it seems fair to assume that Villard knew that the rose windows he drew were different from the structures on which they were based.[60] At the same time, these careful drawings, worked out with compass and straightedge and then meticulously inked, were probably not completed in front of their subjects, so mistaken memory could have played a part.[61] The changes he made in his depictions of these roses seem to show an interest in the totality of their visual effects, and perhaps a potential for something new. As James Hillson has recently reminded us, Villard was impressed with the development of bar tracery, and recorded that aspect of the buildings he saw.[62] His variation on the rose of Chartres has far less stone than the original, as would a bar tracery rose, but does not seem to take into account the difference in construction; it is still, in concept, a plate tracery rose.

We can only continue to guess what purpose the rose drawings served for Villard. He may well have been aware of conversations among masons, perhaps even of the creation of concept drawings on the walls of buildings

59 Bucher, "A Rediscovered Tracing," 317.

60 Brooks, "Villard de Honnecourt: Gothic Carpenter," has called our attention to the details of wood construction in the Portfolio that suggest a much better understanding of carpentry than masonry. In these instances, Villard does not make the mistaken assumptions we see elsewhere.

61 Wirth, 222–28; Villes, 509–13, argues that the drawings of Reims were based on sketches he made on site with notes and measurements.

62 Hillson, "Villard de Honnecourt and Bar Tracery."

under construction, as new and more elaborate designs were created with the development of bar tracery. In comparison to the tracings at Soissons and Saint-Quentin, Villard's drawing of the west rose of Chartres seems to be a creative embellishment inspired by a finished work, but does not reveal the concerns of an experienced builder who was thinking about the problems of constructing the image in stone. This does not necessarily mean he didn't think about this—only that the particular drawing he left us shows no evidence of it. What can be said with some certainty is that Villard's composition belongs to the next generation of rose window tracery, following the west rose of Chartres and the wall reliefs at Saint-Quentin and Soissons. Thus, there is no reason to tie Villard directly to the Saint-Quentin reliefs. At the same time, there is no reason to question the fact that the reliefs at Saint-Quentin are working drawings from the early 13th century and provide a glimpse into a design process that may have been shared at several construction sites.

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CHAPTER 6

Through a Glass, Darkly: Villard's Notebook, the Liberal Arts, and the Problem of Architectural Meaning

Erik Gustafson

Villard de Honnecourt (fl. 1200–40) stands at the crossroads of many debates central to Gothic architectural history. How was the Gothic style developed? How involved were master builders in that process, and could we consider them as 'proper' architects? Was Gothic architecture driven by technological developments or theological ideals? Villard's collection of drawings from the early 13th century is a unique source of potential evidence for such questions. As Carl Barnes noted over 30 years ago, however, Villard is a problem: the resilient understanding of Villard as a medieval architect is as old as the study of Gothic architecture, and still lingers despite being debunked by Barnes decades ago.[1] All we know of him derives from the manuscript he left, a compilation of drawings with occasional textual notes which is exceptional amongst surviving medieval manuscripts.[2] The portfolio of 33 folios contains representations of, "human and animal figures, insects, exercises in applied geometry, machines, gadgets, and ecclesiastical fittings, building construction, sculpture, and architecture," including perhaps most famously drawings

1 See Carl Barnes, "Le 'Probleme' Villard de Honnecourt," in *Les batisseurs des cathédrales gothiques*, ed. Roland Recht (Strasbourg, 1989), 209–23, where Barnes laid out his case for why Villard was not an architect. While Viollet-le-Duc was not the first to discuss Villard as an architect, his writings were central to cementing the idea; see Carl Barnes, "Apparitional Aesthetics: Viollet-le-Duc and Villard de Honnecourt," in *The Four Modes of Seeing*, ed. Evelyn Lane, Elizabeth Pastan, and Ellen Shortell (Farnham, 2009), 465–80. For more recent work considering Villard as an architect see Jean Wirth, *Villard de Honnecourt: architecte du XIIIe siècle* (Geneva, 2015); for recent work treating the Portfolio as a master's book, see Günter Binding, *Was ist Gotik?* (Darmstadt, 2000), 77–80, drawing from the influential Hans Hahnloser, *Villard de Honnecourt: Kritische Gesamtausgabe des Bauhüttenbuches no. fr. 19093 der Pariser Nationalbibliothek* (Vienna, 1935; 2nd ed. Graz, 1972).

2 The manuscript is now in the Bibliothèque National de France, ms. fr. 19093, available for digital consultation at http://gallica.bnf.fr/ark:/12148/btv1b105094l2z (accessed 30 June 2020); see also the most recent critical edition: Carl Barnes, *The Portfolio of Villard de Honnecourt* (Farnham, 2009).

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of Reims and Laon Cathedrals.[3] Villard drew plans, elevations, and quasi-perspectival views of these and other buildings,[4] as well as details of features such as flying buttresses, window tracery, floor tiles, and stonecutting patterns. Such images fit precisely what we today expect from an architect: rationally designed blueprints which also address structural and constructional matters. Villard's Portfolio has even been shoehorned into the treatise tradition, which requires the lack of any textual apparatus to be explained away by the secrecy of the medieval masons' lodge. All these difficulties make Villard's drawings an exceptionally problematic albeit fertile source to draw on when addressing those fundamental debates of Gothic architectural history, leading to conclusions more often predicated on the expectations of the analyst than on the scarce information provided by Villard.

If Villard wasn't a master mason, and there is no way to know who he was, then there is no clear context in which to place his drawings.[5] Even with the caveat that Villard was not an architect, the questions asked of his Portfolio and architectural drawings are still generally rooted in technical architectural issues: are the drawings accurate to the actual buildings, did Villard know the masons or was he even inducted into a masonic lodge, to what degree did his drawings reflect stone yard practices, what objects (sculptures, manuscripts, buildings) was he looking at and copying down?[6] Such inquiries have indeed helped to shed light on medieval technology and construction practices. Villard's architectural drawings reveal that he understood geometrical design principles using a compass and straightedge but are also characterized by a certain degree of imprecision.[7] Villard de Honnecourt straddles the intersection between what could be described as internal and external architectural history: he was interested in design and structure, but his mistakes and inaccuracies

3 Barnes, *The Portfolio of Villard de Honnecourt*, XVI.

4 See for example James Ackerman, "Villard de Honnecourt's Drawings of Reims Cathedral: A Study in Architectural Representation," *Artibus et Historiae* 18, no. 35 (1997): 41–49.

5 For a summary biography see Barnes, *The Portfolio of Villard de Honnecourt*, 215–30. See also George Brooks's article in this volume arguing that Villard was a carpenter.

6 For the myriad publications on Villard, see Carl Barnes, *Villard de Honnecourt: The Artist and His Drawings: A Critical Bibliography* (Boston, 1982), as well as Barnes, *The Portfolio of Villard de Honnecourt*, and the bibliographic addenda covering until 2014 online at http://avista.org/villard/villard-bibliography/ (accessed 30 June 2020). More recently, see also Robert Bork, *The Geometry of Creation: Architectural Drawings and the Dynamics of Gothic Design* (Farnham, 2011), 31–42; and Jean Wirth, *Villard de Honnecourt*.

7 Bork, *The Geometry of Creation*, 31–42; William Clark, "Reims Cathedral in the Portfolio of Villard de Honnecourt," in *Villard's Legacy*, ed. Marie-Therese Zenner (Aldershot, 2004), 23–51; M.F. Hearn, "Villard de Honnecourt's Perception of Gothic Architecture," in *Medieval Architecture and Its Intellectual Context*, ed. Eric Fernie and Paul Crossley (London, 1990), 127–36.

suggest he was an outsider looking in rather than a professional architect. Can we step away from a normative assumed discourse of architectural practice to see the drawings from a different set of historical perspectives?

1 Approaching Villard and His Drawings

A first move in shifting a horizon of expectations for Villard's collection of drawings entails addressing how we label the manuscript. A master's book, a notebook, or a portfolio are the most often used terms, although master's model book has fallen out of favor with the increasing acceptance that Villard was not a professional master builder. The designation we use is significant for how we understand the ensemble, as Barnes emphasized in making a case for titling the manuscript a portfolio.[8] In terms of our modern reading of the manuscript, the differences and overlaps between the labels 'notebook' and 'portfolio' are significant, as they have different ramifications for the potential intentionality of Villard in collecting his drawings. Notebook suggests casual observations, personal reminders, private and internal thought, and recorded observations of things which caught his interest at various times and places. Portfolio taken in the architectural sense suggests a curated collection of examples of someone's work to be presented as a showcase of the maker's talents and abilities for potential clients, a more carefully contrived presentation of specific ideas.

Villard's manuscript seems to fall somewhere in between: the preface suggests the collection is based on three themes (techniques of masonry and carpentry, techniques of representation, and discipline of geometry), and many of the drawings seem to be completed to a presentation standard. Rather than being organized into sequential chapters as we might expect from an edited portfolio, those themes seem to interweave throughout the collection more like a notebook based on a selected set of interests. The layout of drawings on many pages also suggests a more casual approach, that images were made where space could be found when Villard drew them. For example, the preface text on folio 1v establishing the portfolio themes is itself fitted around the previously made figural drawings filling most of the page (Figure 6.1). We are of course also hampered by the loss of many folios which might have made an organizational system more evident, so we are looking at a fragment rather than a complete exemplar. The ensemble seems to be something like a notebook later given some organization into something like a portfolio, but not

8 Barnes, *The Portfolio of Villard de Honnecourt*, 1–2, 23–26.

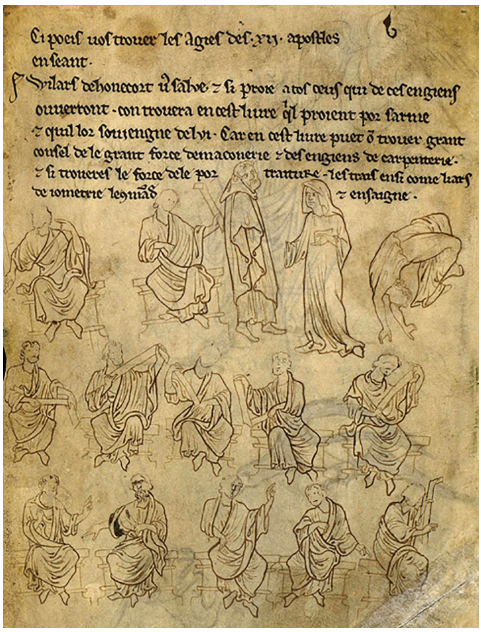

FIGURE 6.1
Portfolio of Villard de Honnecourt, fol. 1v: preface page with figures (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

completely fulfilling the criteria we might expect of either label. In terms of Villard's potential intentionality, considering the manuscript as a notebook first and a *post facto* portfolio second best fits the evidence from the folios themselves. Villard seems to have collected his drawings over a period of years, and only after most drawings were complete does he seem to have added a preface turning the collection into a portfolio. Considering the manuscript as a notebook suggests that the themes later identified in the preface had been of consistent interest to Villard for many years, that Villard had repeatedly noted down an extremely wide variety of examples from the mechanical arts, the arts of representational imagery, and the geometric arts throughout his adult life.

Such an observation raises the question of what motivated Villard to focus on these interests. The long art historical tradition of identifying and studying artistic and architectural model-books has long presumed Villard's intentions, expecting the manuscript to record the ideas of a professional artist or architect.[9] Even following the initial argument that Villard was not an architect, expectations of Villard's interests have largely remained in the artistic sphere: Barnes himself suggested Villard was a metalsmith and George Brooks has argued Villard was a professional carpenter, while François Bucher had already

9 On medieval model books, see Robert Scheller, *Exemplum: Model-Book Drawings and the Practice of Artistic Transmission in the Middle Ages* (*ca. 900–c. 1450*) (Amsterdam, 1995).

presented an alternate supposition of Villard as a subcontractor or apprentice who never advanced and Jean Wirth has recently returned to the old argument that Villard was indeed an architect.[10]

Alternatively, in 2007 Barnes suggested the interpretation that Villard was a lay representative or agent of the cathedral chapter in Cambrai with an active interest in art and architecture, which could suggest Villard had received some level of basic education through a cathedral school that informed his interests.[11] Lon Shelby rejected Hahnloser's interpretation of the portfolio as a workshop textbook based on the liberal arts on the grounds that such a literary model would have been irrelevant for craftsmen and building masters, a position more recently rebutted by Günther Binding who has argued that master architects would have been steeped in just such liberal arts traditions.[12] Binding's work moves to break down presumed delineation between schools/theology and secular architectural practice, a connection given further emphasis by Heidi Gearhart's work on the relationship between the *De diversis artibus* by Theophilus and the practice of both secular and monastic craft as spiritual action.[13] Given the conclusions of Binding and Gearhart, any rupture between the assumed secular, practical interests of artisans and the more lofty theological interests of clergy or monks can be dismissed. In this light, Villard's potential profession can be regarded as tangential to his possible intellectual interests. That is, rather than assuming he made drawings because he was an artist or architect we can instead consider common medieval intellectual traditions as possible motivations for his image-making.

Again, a caveat is necessary. We don't know whether Villard was literate or educated: suggestions that he attended monastic or cathedral schools have been dismissed for lack of evidence. Further, the observation that all the inscriptions in the portfolio attributable to Villard (or possibly a scribe he hired) are in Picard dialect with some Central French influences rather than

10 Barnes, "Le 'Probleme' Villard de Honnecourt," 221–23; George Brooks, "Villard de Honnecourt: Gothic Carpenter," *Avista Forum Journal* 18, nos. 1/2 (2008): 8–23, and reprinted in this volume; François Bucher, *Architector: The Lodge Books and Sketchbooks of Medieval Architects* (New York, 1979); Wirth, *Villard de Honnecourt*.

11 Barnes, *The Portfolio of Villard de Honnecourt*, 229–30, where he also discusses Bucher's subcontractor approach.

12 Lon Shelby, in his review of Hahnloser's 1972 *Villard de Honnecourt*, in *Speculum* 50, no. 3 (1975): 496–500, particularly 497; Günter Binding, *Der früh- und hochmittelalterliche Bauherr als sapiens architectus* (Darmstadt, 1998), 165–206.

13 Heidi Gearhart, *Theophilus and the Theory and Practice of Medieval Art* (University Park, 2017).

Latin has also been used to prove he was uneducated or illiterate.[14] All these arguments for or against Villard's intellectual credentials are made *ab nihilo*. One of the key arguments in the case against linking architecture with meaning and theology has long been the assertion that school education was irrelevant to architectural practice, that not only were such ideas the preserve of patrons rather than artisans, but that artisans would have had no access to education.[15] If we instead accept that medieval artisans might have indeed been conversant to varying degrees in the liberal arts and theology, then considering what thought habits Villard might have learned from a medieval cathedral school *milieu* provides a plausible interpretive framework for his notebook.

Brian Stock has used the term textual communities to address the range of reception between literate individuals who directly read texts and the oral dissemination of those texts by such individuals to a wider community, through time becoming enshrined in collective memories and even social practices.[16] Members at the edges of such textual communities might learn of the ideas in the texts at second or third hand from intermediaries rather than the central readers, receiving possibly less accurate synopses of the core texts.[17] Whether Villard was an artisan or an episcopal agent, we can posit at the least that Villard was exposed to key liberal arts ideas through such textual communities around the episcopal centers of Cambrai and Reims where he seems to have spent considerable time. The idea is not to treat Villard as a university scholastic theologian, but to consider him as a reasonably educated man of his time, either through his own literacy or an oral textual community. That he was sent to Hungary, presumably as someone's representative carrying out an unknown

14 Barnes, *The Portfolio of Villard de Honnecourt*, 14–15, 216–17. For the idea of Villard as illiterate, see Wilhelm Schlink, "War Villard de Honnecourt Analphabet?," in *Pierre, lumière, couleur*, ed. Fabienne Joubert and Dany Sandron (Paris, 1999), 213–21, and Carl Barnes response in *AVISTA Forum Journal* 12 (2001): 15–17, as well as Wirth's response in *Villard de Honnecourt*, 16–29.

15 See for example Peter Kidson's classic refutation of Panofsky's theories on Suger's theology and the Gothic, "Panofsky, Suger and St. Denis," *Journal of the Warburg and Courtauld Institutes* 50 (1987): 1–17, in which he asserts, "for by its very nature medieval architecture involved mysterious operations that were excluded from the conspectus of the liberal arts and therefore beyond the understanding of even the most highly educated ecclesiastical patrons," 2.

16 Brian Stock, *Listening for the Text* (Philadelphia, 1990), 16–29, 140–58; idem, *The Implications of Literacy* (Princeton, 1983), 88–92.

17 George Brooks has made an analogous argument for Villard's reception of Vitruvius in "The 'Vitruvian Mill' in Roman and Medieval Europe," in *Wind & Water in the Middle Ages*, ed. Steven Walton (Tempe, 2006), 1–38.

task,[18] suggests a modicum of sociopolitical standing consistent with potential access either to the costs of education or to prolonged conversation with those who had been educated.[19]

In the 12th and early 13th centuries the cathedral school of Reims included both lay and clerical students, covering at the elementary level both literacy as well as the liberal arts comprising the *trivium* (grammar, dialectic, and rhetoric) and *quadrivium* (arithmetic, music, geometry, and astronomy), while advanced study focused on theology.[20] Given Villard's close ties to the Cathedral of Reims as an agent or an artisan, he may well have either attended the cathedral school at the lower level, or may have known students from whom he became aware of the general outlines of the contemporary liberal arts thought. The aim here is to consider whether Villard might have been looking through the learned habits of a common medieval intellectual tradition—namely the liberal arts—which could supply a framework for Villard's thought while also allowing him personal agency to apply such a system in his own idiosyncratic way in his notebook drawings.[21]

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18 Barnes, *The Portfolio of Villard de Honnecourt*, 220–22.

19 On the costs of university education in Paris, see Ian Wei, *Intellectual Culture in Medieval Paris* (Cambridge, 2012), 72–78, 118–19; on the shift towards court schools in the later 12th century see C. Stephen Jaeger, *The Envy of Angels: Cathedral Schools and Social Ideals in Medieval Europe, 950–1200* (Philadelphia, 1994), 292–324; as well as S.C. Ferruolo, *The Origins of the University: The Schools of Paris and their Critics 1100–1215* (Stanford, 1985), 27–30.

20 John R. Williams, "The Cathedral School of Reims in the Time of Master Alberic, 1118–1136," *Traditio* 20 (1964): 93–114; particularly 95, 111–12 on liberal arts as elementary education; see also Cédric Giraud, "Le reseau des écoles cathedrales dans la province ecclésiastique de Reims, dans la première moitié du XIIe siècle," *Cahiers de recherches médiévales et humanistes* 18 (2009): 39–51, who also mentions the small cathedral school in Cambrai, Villard's home diocese, 41. A university would not be founded in Reims until 1548. The liberal arts also formed the elementary level of education at the University of Paris in the 13th century, although the emphasis was on the *trivium* and dialectic: Wei, *Intellectual Culture in Medieval Paris*, 95. While education based on the liberal arts was becoming conservative in the face of a rising emphasis on dialectic and scholasticism at the University of Paris, the cathedral schools of Reims and its diocese were no longer international centers of education in the early 13th century; Jaeger, *The Envy of Angels*, 278–91.

21 On the habits learned in medieval education, see Mary Carruthers, *The Craft of Thought* (Cambridge, 1998), as well as Erik Gustafson, "Medieval Franciscan Architecture as Charismatic Space," in *Faces of Charisma*, ed. Brigitte Bedos-Rezak and Martha Rust (Leiden, 2018), 323–47, particularly 323–25 applying medieval mental habits to architectural experience.

2 The Liberal Arts and Villard's Notebook

During the 12th century, the ancient Neoplatonic origins of the liberal arts tradition was given new emphasis by theologians seeking to understand the place of humanity within the totality of the divine order of creation.[22] In this intellectual tradition, the liberal arts comprised the disciplines through which man could acquire wisdom and understand how reality was ordered by God. As John of Salisbury explained, "… the Trivium has disclosed the significance of all words, … the Quadrivium has unveiled the secrets of all nature."[23] While in the 12th century scholars tended to write books summarizing such an epistemological system,[24] in the 13th century this enterprise turned into the rise of encyclopedism as an attempt to summarize the details of that knowledge.[25] Such books compiled data in order to, "seek the eternal truths that are obscurely signified by the objects in the material world."[26] This intellectual tradition relied on Neoplatonic figural image theory rooted in 1 Corinthians, in which words and natural objects can be understood as obscure reflections of God's magnificence and design.[27] Accordingly, the finite and observable in this world provide the means for the properly educated (and faithful Christian) to apprehend the universal, divine meaning of creation.[28] This hierarchy

22 On the ancient Neoplatonic context and Late Antique consolidation of the liberal arts, see Mark Vessey's introduction to Cassiodorus, *Institutions of Divine and Secular Learning and On the Soul* (Liverpool, 2004), 64–66. On 12th-century humanism and the liberal arts, see R.W. Southern, *Scholastic Humanism and the Unification of Europe* (Oxford, 1995), 1:22–35; Marie-Dominique Chenu, *Nature, Man, and Society in the Twelfth Century* (Toronto, 1997), 1–48. On 12th-century depictions of the liberal arts, see Laura Cleaver, *Education in Twelfth-Century Art and Architecture* (Woodbridge, 2016).

23 John of Salisbury, *The Metalogicon*, translated by Daniel McGarry (Berkeley, 1962), 36.

24 In addition to John of Salisbury's *Metalogicon*, other major books in this tradition include Hugh of Saint Victor's *Didascalicon*, Thierry of Chartres's unfinished *Heptateuchon*, and Bernardus Silvestris's *Cosmographia*, among others. Some 13th-century writers also produced similar books, such as Bonaventure's *De reductione artium ad theologiam*.

25 Mary Franklin-Brown, *Reading the World; Encyclopedic Writing in the Scholastic Age* (Chicago, 2012); as well as Peter Loewen, *Music in Early Franciscan Thought* (Leiden, 2013).

26 Franklin-Brown, *Reading the World*, 15.

27 Paul's 1 Cor 13:12, "Now we see through a glass, darkly," was commonly adapted into the metaphor of a darkened mirror by medieval theologians as a metaphor for the Neoplatonic hierarchy of knowledge; see Franklin-Brown, *Reading the World*, 33–92, particularly 45–46; see also Conrad Rudolph, *The Mystic Ark: Hugh of Saint Victor, Art, and Thought in the Twelfth Century* (Cambridge, 2014).

28 As Hugh of Saint Victor instructed, "Every analysis begins with things which are finite, or defined, and proceeds in the direction of things which are infinite, or undefined. … Furthermore, we investigate with our reason (the proper function of which is to analyze) when, by analysis and investigation of the natures of individual things, we descend from

from the literal appearance, to the obvious meaning, and then to a deeper, hidden meaning comprised the basic training of liberal arts looking, reading, and understanding.[29] While study of the deeper meaning entailed mastering theology, investigation of the literal and natural levels was the goal of the liberal arts. The curriculum for geometry was largely based on close study of the first four books of Euclid's *Elements*, framed by the theoretical structure of the liberal arts as outlined by authors such as Hugh of Saint Victor.[30] Indeed, Marie-Thérèse Zenner has recognized Villard's drawings as "a key monument of practical geometry" steeped in the Euclidean tradition.[31] For someone educated in the basics, training in the *quadrivium* provided arithmetic and geometric keys to understanding the natural world, if they were so inclined to look.

If Villard either had such a liberal arts education or had been exposed to the liberal arts textual community while he mastered Euclidean geometry, then his Portfolio might reflect such an intellectual worldview, particularly in applications of the mathematical *quadrivium* and the subsidiary mechanical arts.[32] Indeed, Villard's Portfolio is a collection of examples of the natural world, the mechanical arts, and use of applied geometry (the *ars de iometrie* invoked in his preface).[33] While Villard at some point *post facto* organized his drawings within the Portfolio, the collection was not an attempt to systematically order the knowledge Villard had collated. That is, to use the theological definition of

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universals to particulars." *The Didascalicon of Hugh of Saint Victor*, translated by Jerome Taylor (New York, 1961), 92. Further, "By contemplating what God has made we realize what we ourselves ought to do. Every nature tells of God; every nature teaches man; every nature reproduces its essential form, and nothing in the universe is unfecund," 145.

29 Again from Hugh of Saint Victor, "Exposition includes three things: the letter, the sense, and the inner meaning. The letter is the fit arrangement of words, which we also call construction; the sense is a certain ready and obvious meaning which the letter presents on the surface; the inner meaning is the deeper understanding which can be found only through interpretation and commentary," *Didascalicon*, 92 and again at 147.

30 Irene Caiazzo, "Teaching the *Quadrivium* in the Twelfth-Century Schools," in *A Companion to Twelfth-Century Schools*, ed. Cédric Giraud (Leiden, 2020), 180–202, particularly 196–98; see also Pierre Riché, *Écoles et enseignement dans l'Occident chrétien: de la fin du v^e^ siècle au milieu du xi^e^ siècle* (Paris, 1979), 267–79. It is also worth noting that Hugh of Saint Victor wrote a book on practical geometry, the *Practica geometriae*, in which he was the first to make a distinction between theoretical and practical geometry.

31 Marie-Thérèse Zenner, "Villard de Honnecourt and Euclidean Geometry," *Nexus Network Journal* 4, no. 2 (2002): 65–78, with the quote on 75.

32 On the mechanical arts, see Elspeth Whitney, "Paradise Restored: The Mechanical Arts from Antiquity through the Thirteenth Century," *Transactions of the American Philosophical Society* 80, no. 1 (1990): 1–169; George Ovitt, "The Status of the Mechanical Arts in Medieval Classifications of Learning," *Viator* 14 (1983): 89–106.

33 Transcribed and translated in Barnes, *The Portfolio of Villard de Honnecourt*, 35.

systematize, Villard did not seek to present a rational structured summary of an intellectual tradition, unlike the contemporary scholastic thinkers writing encyclopedic summae and compendiae.[34] Read from a liberal arts mindset, the drawings can be understood to represent the products of Villard's looking and understanding of the sacred visual world around him. If we accept the premise that Villard valued geometric order as an obscure reflection of God's design, based on a liberal arts textual tradition or textual community, then we can see throughout Villard's notebook myriad examples of his fascination with geometric order in the world around him.

Villard's inscriptions on various pages are resolutely practical in tone, in no way acting as an intellectual commentary on the drawings. Such an empirical focus certainly distances Villard from the cosmological upper echelons of theology, although his practical and experimental interests have certain parallels in Aristotelian thought.[35] From this perspective, the Portfolio is not a textual commentary but is a wide-ranging collection of visual *exempla* which display how the ideal order of the world can be both demonstrated and crafted in material things. Such an interpretation is not explained to the Portfolio's reader; the author expects the reader to share this frame of reference, to see, think through, and apply the same parameters as Villard. The drawings generally present the literal surface level, but Villard occasionally also suggests the hidden geometry underlying that surface, such as on folio 18v which Villard identifies as the beginning of the "techniques of representation as the discipline of geometry instructs for facilitating work" (Figure 6.2).[36] Villard expects his reader to understand geometry as one of the liberal arts, but leaves the reader free to read both this page as either a simple collection of examples for the geometric structuring of images or as the first step in providing images with the geometric harmony of divine creation, a virtuous spiritual act by the artist or viewer.[37]

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34 Compare with the equally idiosyncratic 12th-century *Liber Floridus*; Albert Derolez, *The Making and Meaning of the Liber Floridus* (London, 2015).

35 For the problems of Aristotelian thought and the encyclopedic movement, see Franklin-Brown, *Reading the World*, 50–53.

36 Barnes, *The Portfolio of Villard de Honnecourt*, 116–21 for descriptions and analyses of this folio. The inscription reads, "Ci commence li force des trais de / portraiture si con li ars de iometrie / les ensaigne. por legierement ovrer. / F/ et en lautre fuel sunt cil de le maconerie."

37 Such a reading is particularly apposite in light of Gearhart's reading of Theophilus's approach linking artistic practice with virtue and the ascent of the soul through the seven gifts of the Holy Spirit; Gearhart, *Theophilus and the Theory and Practice of Medieval Art*, 67–88.

FIGURE 6.2
Portfolio of Villard de Honnecourt, fol. 18v: techniques of representation (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

Villard's emphasis on geometry is key here, consistently applied throughout the Portfolio both as overlays on figural representations as well as employed within the design of figures and buildings. His recommendations for particular designs such as the lectern on folio 7r can be understood as conceptual exercises in applied geometry.[38] Even for objects Villard clearly visited and explored, such as the Cathedral of Reims, he adjusted elements of the building in his drawings. As William Clark has shown, Villard sacrificed architectural accuracy for his own geometric consistency and order.[39] In his drawing of chevet flying buttresses at Reims Cathedral on folio 32v (Figures 6.3 and 6.4), the buttresses are too closely spaced, the angle and alignment of the flyers is incorrect, the passages through the buttresses and wall are wrong, and the responds for the interior vaults and window are misplaced, as is the angel's aedicule above

38 Barnes, *The Portfolio of Villard de Honnecourt,* 55–56 for descriptions and analysis of the folio. Seeing here could be read as imagination rather than the literal sight sense expected by the modern episteme; on the medieval understanding of imagination, see Michelle Karnes, *Imagination, Meditation and Cognition in the Middle Ages* (Chicago, 2011), 23–61.

39 Clark, "Reims Cathedral in the Portfolio of Villard," 23–51.

FIGURE 6.3 Reims Cathedral, *c.*1211–1345, exterior
PHOTO: AUTHOR

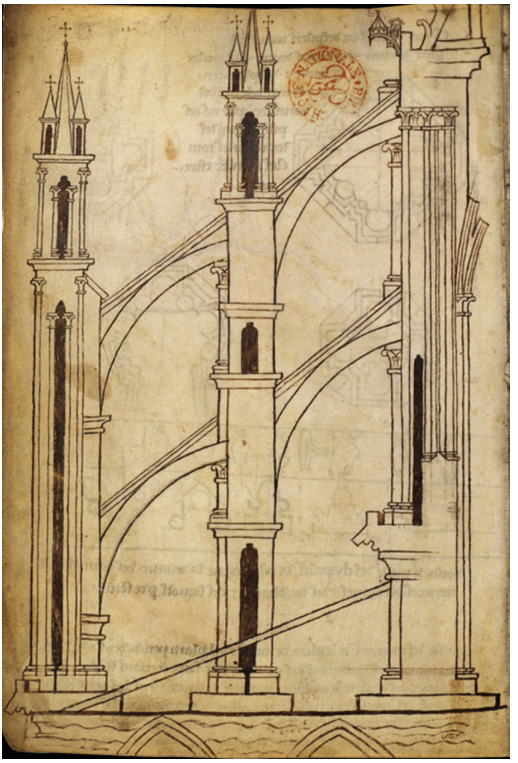

FIGURE 6.4
Portfolio of Villard de Honnecourt, fol. 32v: Reims flying buttresses (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

the upper, inner flyer. But the drawing was so regularly laid out that it has even been taken to be a lost, first design.[40]

His drawing emphasizes geometric order and regularity over structure, but why? If we consider that the intellectual tradition in which Villard might have been thinking was based on the liberal arts and in particular the *quadrivium*, then Villard's interest in searching out and drawing his understanding of the cathedral's geometric order now might have a non-architectural context. This is perhaps more evident in Villard's drawings of the nave interior and exterior elevation on folio 31v (Figure 6.5) in which he has invented a nave dado arcade on the interior elevation not present in the completed building (Figure 6.6).[41] The geometric proportions of both the internal and external elevations are evident to the trained eye, while the added nave dado provides a harmonic balance between the upper and lower halves of the interior elevation (clerestory/triforium and aisle windows/dado arcade). The geometric angels at the top of the nave exterior elevation remind the reader of the geometric representational imagery on folios 18v and 19r, serving as a visual cue that geometric representation is present here as well. A reader with a particularly trained eye might also note the pinpricks at the center of three oculi where a compass was anchored, a further reminder of the geometric basis for the drawings.

On folio 31v the three-dimensional complexity of the nave structure is reduced to simple two-dimensional images, schematizing the building into a visually dense representation which emphasizes the key visual components of the elevation such as the piers, colonettes, capitals, windows and tracery, and horizontal moldings. These are the architectural elements which are designed by geometric means, but which also best visually demonstrate that geometric order of the building to the informed viewer. Like Villard's many figural drawings throughout the notebook in which he does not display the geometric design underlying a composition, Villard does not directly reveal the geometric schemes of the elevations. Rather, he expected his viewer to extrapolate from his direct examples on folios 18v and 19r (Figure 6.2), considering and holding the divine geometry in their minds.

Villard's drawings of the masonry techniques, windows, chapels, elevations, and flying buttresses at Reims together reflect an analysis of geometric order in the cathedral, moving from the granular of masonry patterns on folio 32r[42]

40 Clark discusses and debunks the idea, "Reims Cathedral in the Portfolio of Villard," 26–32.

41 Barnes, *The Portfolio of Villard de Honnecourt*, 198–200 for descriptions and analysis of the folio.

42 Barnes, *The Portfolio of Villard de Honnecourt*, 201–06 for descriptions and analysis of the folio.

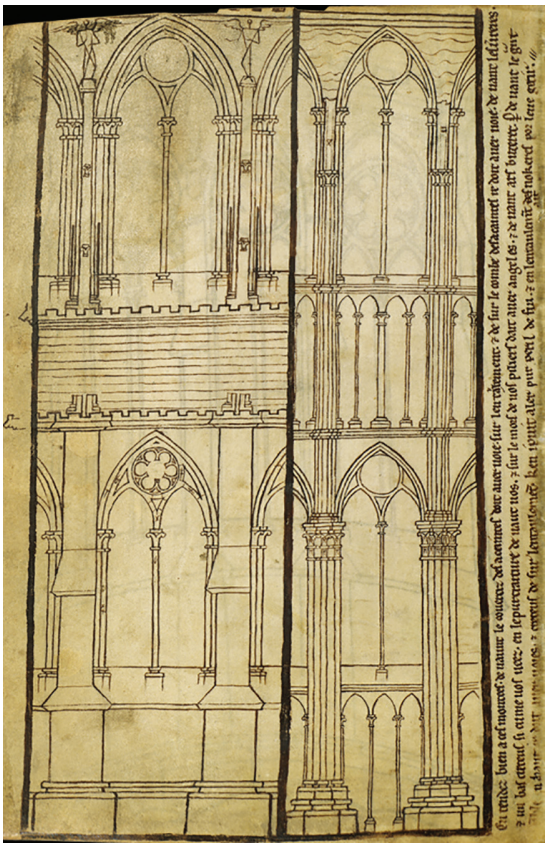

FIGURE 6.5 Portfolio of Villard de Honnecourt, fol. 31v: Reims interior and exterior nave elevations (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

(Figure 6.7) to the macroscopic with the nave elevation drawings on folio 31r, distantly mirroring the interpretive system of theologians such as Hugh of Saint Victor. Indeed, sacred architecture, like liberal arts theology, could be understood as a bridge from the surface level of nature to the eternal truths of God, mediated through the art of geometry. If Villard was indeed thinking with the intellectual habits of the liberal arts, such an interpretation might be as close to a theological analysis as someone educated only in the *trivium* and *quadrivium* might attempt. From this perspective the geometrical order of the flying buttresses and nave elevations are not understood in the modern sense as markers of structural revolution designed by ingenious architects, but might

FIGURE 6.6 Cathedral Reims, *c.*1211–1345, Reims, nave
PHOTO: AUTHOR

be understood in a medieval sense as obscure reflections of God's eternal truth made tangible by the *quadrivium*, and in particular by the liberal art of geometry.

3 Conclusion, by Way of the Problem of Architectural Meaning

Questions of meaning and Gothic architecture have been a lightning rod for debate in medieval architectural history for nearly the entire history of the discipline. At the crux of the dispute is the burden of proof for both intentionality and audience reception: how can one prove what medieval builders and patrons intended their structures to communicate, and how can one prove that the viewing public understood or even cared about such meanings? Unlike artistic iconography where figural representation orients the viewer directly

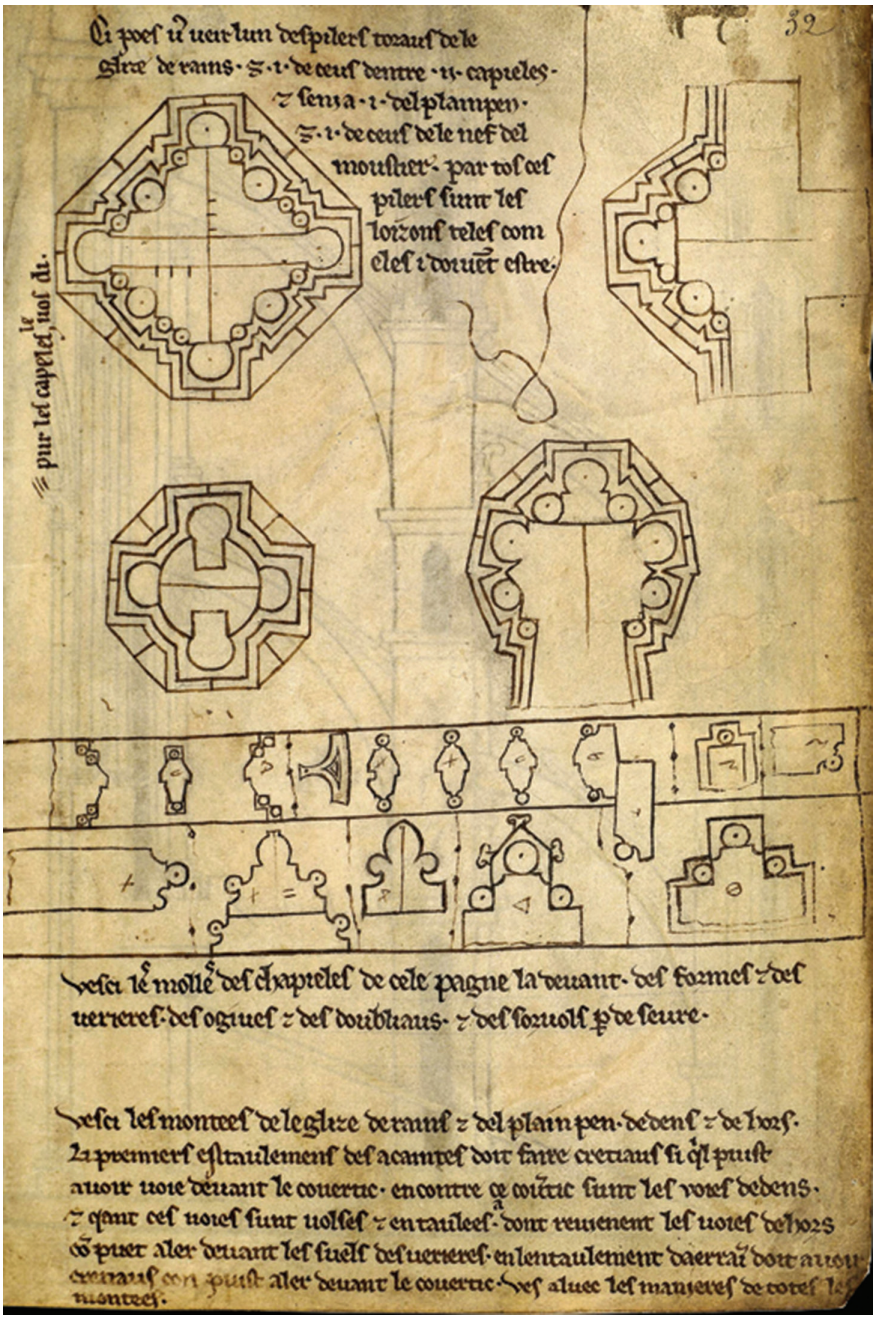
Ci poes ū ueir lum despilers toraus de le
glize de rains · z · i · de ceus dentre · ii · capeles ·
z sen a · i · del plampen ·
z · i · de ceus de le nef del
mouster · par tos ces
piliers sunt les
loizons teles com
eles i doiuēt estre ·
pur les capeles, nos di.
32
Vesci le molle des chapeles de cele pagne la deuant · des formes z des
uerreres · des ogiues z des doubliaus · z des sozuols p de seure ·
Vesci les monteés de leglize de rains z del plain pen · dedens z de hors ·
La premiers estraulement des acamptes doit faire creciaus si qi puist
auour uoie deuant le couertc · encontre ce coitre sunt les voies dedens ·
z qant ces uoies sunt uolses z en raileés · dont reuienent les uoies de hors
co puist aler deuant les fueis des uerreres · en lentaulement daerriā dont auou
creiaus con puist aler deuant le couertc · Ves aluec les manieres de cotes les
monteés.

FIGURE 6.7 Portfolio of Villard de Honnecourt, fol. 32r: Reims pier masonry patterns (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

towards the intended sphere of references, architectural representation is more abstract. Aside from architectural copies which can visually function along the lines of figural representation, architectural elements generally do not look like the concepts they might invoke. Systems of thought and patterns of similar socioreligious practices have been used to present contexts in which such formal ensembles might signify, although such analyses also often fall afoul of positivist-inflected criticisms. In the positivist tradition of textual analysis, something can only signify if explicitly stated in a text which can be directly linked to the individuals (authors, artists, viewers) involved. Brian Stock's idea of textual communities is in part a reaction to that tradition, arguing that a text isn't defined solely by an individual reading but also has social ramifications for the actions of a broader community informed by both literacy and orality of the text's ideas.[43] Gauging the spread of a social or intellectual practice then provides the evidence for a textual community, supplying proof for the relevance of a field of meaning within a given historical context while also allowing for the potential overlapping of multiple textual communities and spheres of meaning. While we cannot prove what historic individuals were thinking in a positivist causal sense, we can demonstrate the historical influence of widespread textual communities. Moreover, we can show how buildings and their representations fit into such intellectual communities, moving further towards restoring medieval habits of understanding to Gothic architecture.

The wide diffusion of the liberal arts textual community is demonstrated by the presence of personifications of the seven liberal arts on many cathedral portal ensembles, such as the central portal of the Cathedral of Saint-Étienne in Sens where the reliefs are at eye level to one's left as one enters through the central portal of the western façade (Figure 6.8).[44] The figures are placed between the now-lost standing saints above and representations of wild animals below, consistent with the intellectual role of the liberal arts to help understand man's place in God's order between heaven and earth. The inclusion of the liberal arts on the portal ensemble cued one of several potential mental frameworks for the faithful congregant entering the cathedral, from cosmological considerations of God's design to personal penance or even social commentary as one approaches the sacred space within.

I have argued that a basic liberal arts education in the *trivium* and *quadrivium*, or exposure through textual communities around the liberal arts, could have given Villard both a practical understanding of the art of geometry as well as a basic understanding of the general Neoplatonic hierarchy linking the mundane to the

43 Stock, *Listening for the Text*, 16–29, as well as his earlier *The Implications of Literacy*.

44 Cleaver discusses representations of the liberal arts in *Education in Twelfth-Century Art and Architecture*, 8–16.

FIGURE 6.8 Sens, Cathedral of Saint-Étienne: west façade, left flank of the central portal, figural representations of the seven liberal arts
PHOTO: AUTHOR

divine through geometry. Framed by such an intellectual tradition, Villard can be seen as a medieval thinker responding to both the natural world around him as well as the monumental sacred art and architecture of his day. Since we don't know whether he was literate or not, but that he clearly placed great value on his drawings, it might be reasonable to hypothesize that Villard chose to record his thoughts by drawing in a notebook which he later organized and bound together as his Portfolio. In the image theory framework of the liberal arts, visual representations are an intermediary stage between the thing observed and the abstract concepts which give them meaning. "Now we see through a glass, darkly," in Paul's phrasing from 1 Corinthians 13:12, the point of departure for medieval Neoplatonic image theory. To take image making as a spiritual practice, drawing and understanding the image are the active components of virtuous Christian interaction with the mundane world, while writing and reading about more abstract concepts would be a contemplative action more appropriate for monks, clerics, and theologians. Perhaps such a consideration informed why Villard left behind a visual portfolio with minimal text, but that of course is supposition.

Returning to the question of architectural meaning, bringing a medieval intellectual framework such as the liberal arts to bear on Villard's images allows us to decouple our learned expectations of how we should see and understand the Portfolio. His drawings of architectural plans, elevations, windows, and masonry patterns match the kinds of images we expect in an

architectural *atelier*, serving as visual proof *ipso facto* that Villard must have been an architect. Even after that identification had been debunked, the dominant expectations of medieval architectural history have continued to address the drawings in traditional architectural terms. Villard's repeated proximity to cathedral schools teaching the liberal arts, his trip to Hungary as some sort of representative or agent, and his own mentions of the art of geometry all combine to suggest Villard would have been part of a liberal arts textual community. When thinking through the liberal arts mental habits, elements such as the flying buttresses and nave elevations are recast from modern-view markers of the Gothic structural revolution to medieval-view images of the divine order created by God. Masons building monumental Gothic structures were aware of the structural aspects of flying buttresses and pointed arches, but as Maile Hutterer has shown flyers could signify radically different ideas and values for nonprofessionals, potentially like Villard.[45] For a medieval individual inculcated with a liberal arts perspective, the geometric patterns encountered in carpentry, architecture, and figural imagery were all diagnostic of God's magnificence and design as seen through the darkened glass of human faculties.

This is not to say that the proposed reading of Villard's Portfolio through the liberal arts is categorically correct, or that it is the only possible medieval intellectual frame of reference. Nor is this approach meant to explain every detail of Villard's notebook. Considering the liberal arts tradition as a framework for reading Villard's notebook is a point of departure for considering different levels of investigating the history of architectural experience. While Villard recorded many granular details of building construction, I suggest he also left a unique visual testament to a medieval perspective on visual culture through the liberal arts, one of many different potential understandings of medieval architecture. I leave the final idealizing word to a medieval author, Hugh of Saint Victor, to remind us that we must search out medieval reasons rather than expect to find mirrors of our own.

> For unless he has first come to know for certain what form of reasoning keeps to the true course of argument, and what form keeps only to a seemingly true course, and unless he has learned what form of reasoning can be depended upon and what form must be held suspect, he cannot attain, by reasoning, the imperishable truth of things.[46]

45 For an analysis of the broad semantics of flying buttresses, see Maile Hutterer, *Framing the Church: The Social and Artistic Power of Buttresses in French Gothic Architecture* (University Park, 2019).

46 Hugh of Saint Victor, *Didascalicon*, 58.

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PART 2

Villard de Honnecourt: Medieval Technology

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CHAPTER 7

Mortar, Measure, Masonry: Who Created the Gothic Style?

John James

The medieval building trade was organized to work successfully with slow-setting mortar and without universal measure.[1] The implications of these two limitations affected the industry from the decline of the Roman Empire, and possibly much earlier, and continued to recent times until hydrated cement replaced aerated mortar and we submitted to a common system of measure. First, mortar limited what could be built at one time, after which the builder had to stop work and find another job. Short-term campaigns were how masons built for over a thousand years. During the boom the next job would have been easy to find, for major projects required more than 20 seasons and the small five or six. Second, without measure details could not be shared. Therefore, masons had to develop ways to create templates without help from their predecessors. As every man's geometry was his own, there was no benefit in reemploying the same master when work resumed after the winter, leaving the new man the opportunity to modify profiles and elements. Consequently, there were few places where one man could build a work from start to finish, and it follows that the creators of Gothic architecture are seldom going to be identified from the completed building.

Almost nothing in their methods or training aligns with today's industry. We cannot conceive what it would have been like to be a medieval builder unless we shuck off our learning and start from scratch. Mantras to define the trade could have been:

- None of us will be long on the job.
- We cannot share anything precisely.
- Whoever is next can do as he likes.
- Without geometry we cannot build.
- We have a very limited choice of designs.
- No matter how clever, we shall be forever unknowable.

1 In this chapter, pages from https://www.creationofgothic.org will be noted *COGA- with headings separated by hyphens.

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1 Mortar

We have known about the properties of medieval mortar for a long time.[2] Modern mortars are hydraulic and set as the lime interacts with water. Medieval mortar, on the other hand, was nonhydraulic, meaning it was made from limestone that had been burnt to remove carbon dioxide and moisture, called quicklime. On site, quicklime would be slaked with water to keep out the air and prevent setting while making the mix plastic enough to be worked, as we see in medieval drawings. It will keep indefinitely stored in water, and when open to the air reacts with carbon dioxide to set. This is a gradual process that returns the mortar to its original state of limestone.[3] When insulated from the air mortar has remained unset for centuries.[4]

To use quicklime, it is slaked with water to form a slurry that requires some months to mature into lime putty. When workable, the putty has a creamy consistency and is called fatty mortar. Mortar has value only in compression and needs protection to lengthen setting time and to prevent freezing. Unlike cement mortar it will not shatter with movement as it is weaker than the stone, and happily resets afterwards as any free lime will dissolve when damp to fill the cracks. It was the safest way to build long term as self-healing reduced the risk of collapse.[5] Even the thinnest joints between ashlar require months to set, not days, and the thicker the bed the slower the set.[6] Shrinkage and settlement were major issues,[7] in walls, arches, footings, and vaults.[8]

Most thick walls and piers consist of a thin skin of masonry holding a core of wet sludge and detritus that risked pushing the skin outwards. Masons had to wait until the set had begun and the mortar had taken on some consistency

2 See Ashurst, *Mortar* and discussions with Brian le Mar and Peter Long, both *Magister fabricae* at Canterbury, Georges Duval, Inspecteur Général des Monuments Historiques, Guy Nicot, architect-en-chef at Chartres, and my long-time collaborator, Dominique Maunoury, architect, all now passed on. James, *Template-Makers*, 63–81, especially 78–81 updated in https://www.academia.edu/44603452. John Fitchen, *Gothic* and "Slow Setting Time," 262–65; James, *Contractors*, 79–81 and 12 n. 12; Viollet-le-Duc, *Dictionaire*, 402–03; Salzman, *Building*, 149–54.

3 Modern hydrated lime is either hydraulic (hardens under water) or nonhydraulic (does not harden under water). These do not concern us.

4 Brunet, "Soissons," 65–99; Fitchen, "Slow Setting Mortar," Aubert, "Ogives," 5–67 and 137–237; the engineers Ove Arup advised that at York Minster 12 months was needed before striking.

5 Salzman, *Building*, 24–28.

6 Mortar with pebbles and shells kept stones apart and quickened erection, often in piers.

7 At Chartres the shrinkage was in the order of 8%, James, *Contractors*, 440 and 481.

8 Mark, *Experiments*, 13–15, and 77.

before placing further loads.[9] This limited the height that could be erected in a season. One contract for a tower reads "that a height of about ten or twelve feet per year was considered best."[10] This protocol offered minimal risk, and I name it the Standard Maximum.

Arches were delayed to allow settlement before the centering could be struck, because if loaded too early the arch would continue to settle and open a gap under the soffits.[11] After striking larger spans there was a second delay of at least four weeks while the voussoirs adjusted to not being supported.[12] Abbot Suger provides a 12th-century reference to this, describing a storm in which, "the force of the contrary gale hurled itself against the … main arches that were not yet held together by the bulk of the serveries … nor supported by any scaffolding."[13]

Setting time imposed the most significant restriction on construction. We cannot imagine continuous progress except under unusual circumstances. This fact alone is enough to radically change our view of medieval building history. Therefore, seldom were even a dozen courses built at a time, and usually half or a third of that. From the most cursory examination, the discrepancies in profiles and elements indicate the short-term nature of medieval engagements.[14] Once the agreed amount had been completed, and if there was nothing more to do, the masons would leave for another site.[15]

1.1 *Consequences 1*

These technical limitations were normal and can be found in nearly all buildings. Though I would hesitate to say campaigns were annual, short periods on

9 In 1983 Georges Duval, Inspecteur General des Monuments Historiques, wrote me "Il faut toutefois remarquer que les mortiers ne peuvent faire prise qu'en présence de l'air : cette prise était très lente." The foreman at Westminster Abbey told me that when they relaid the southern flyers in 1989, French hydrated lime was used and the arches were left for six weeks before the formwork was struck.

10 Harvey, *Gothic World*, 17; Salzman, *Building*, 445.

11 The cloister voussoirs had settled about 15 mm over a span of four meters, Brian le Mar *Magister fabricae* at Canterbury in 1980s. Fitchen, *Vault Erection*, 129 and 262–65; Heyman, "Masonry Arches."

12 Brian le Mar, Guy Nicot, and Dominique Maunoury each found from experience that weeks rather than days would be needed for the second stage.

13 Panofsky, *Abbot Suger*, 109. Building terms corrected for clarity. Crosby, *The Royal Abbey*, 216–20.

14 Lagny for example, James, *Template-makers*, 24–25.

15 For travel maps Harvey, *Gothic World*, frontispiece, 38, 51. See n. 87. For an example of a carver see, https://www.creationofgothic.org/COGA/newcarverspage.php?carverid=Faceter&csort=0&certsort=0&confsort=&srch_importance_1=1&srch_attribution_1=High&page=map.

site would have been the norm. Fatty mortar meant that multiple contracting with mobile teams was unavoidable, and natural. This may be why we know so few names before the 13th century.[16] The nature of mortar created conditions of work and organization that bred men, both masons and clients, who were adaptable. Their job was not to create the whole in a single operation, but to start with whatever stage the job had reached and add a modest increment.[17] Much writing has been misinformed because modern building procedures are so different from the medieval reality.[18] Short-term contracting posed the least risk for the greatest gain in most circumstances. As Nicola Coldstream notes, "Masons tended to work at a task, contracting for a specific small job such as building a wall."[19] In one season a team could have worked on the Chartres tower for a dozen weeks or so, moved to Étampes to lay six courses of ashlar in the northern walls, then moved to Goussainville to lay up the crypt vault, and ended the year at nearby Saint-Arnoult-sur-Yvelines adding a door to the nave. There were always men on the move, individually or in caravans, singly or with families, crisscrossing the lanes and highways, taking up their tools in one place after another and never resident for long.[20] During the boom there was always a job that offered certainty of employment,[21] though slack times during the crusades would have been more difficult (Figure 7.1).[22]

We deliver cement and masonry by truck and pipe, but then each load was carried on men's backs. Construction was slow and labor intensive. Speed depended on the number of men in the team. Small domestic teams may have spent the entire season building each of the five- or six-course campaigns in the Cerseuil nave,[23] and larger assemblies like Saint-Denis and Chartres, may

16 James, "Discontinuous Contracting."

17 Shelby, "Chartres," 174.

18 In squeezing the medieval scene into a 20th-century mold, historians have had to distort much of the evidence: James, "Memes."

19 Coldstream, *Medieval Craftsmen*, 17.

20 Porter, *Medieval Architecture*, 7; James, "Sculpteur Chartrain en Italy"; Day, "Jehan Gillemer"; Schmitt, "Travelling Carvers"; James, "Master Félix"; Boyer, "Working at the Bridge Site."

21 The concept of the "boom" for the century after 1120 suggested in James, *Contractors*, 555, and more fully in James, "Funding," 41–82.

22 Graph calculated from relative costs of 850 more significant churches in the Paris Basin; cost was established from a standard unit, https://www.creationofgothic.org/COGA/list-new.php?srch_for=&srch_importance_1=1&srch_importance_2=2&srch_importance_3=3&page=graph.

23 James, *Template-makers*, 214–17.

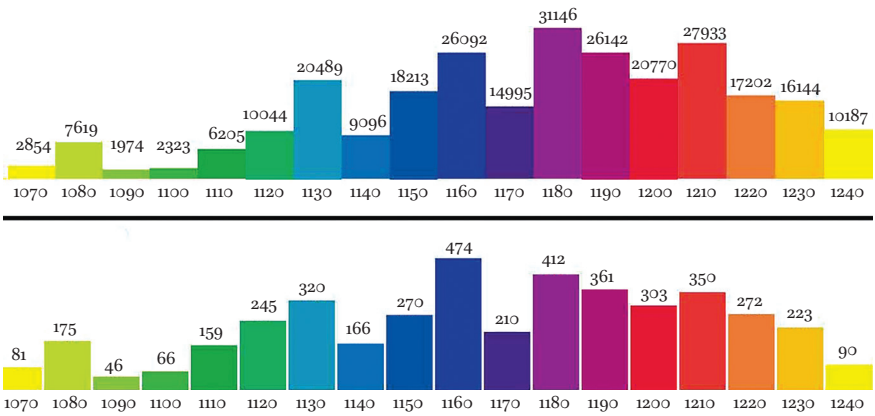

FIGURE 7.1 Graph of costs of construction and numbers of churches, by decade (COGA)

have needed an entire season to cut and lay a few courses.[24] Transport and space to work may have formed the critical path, and let's not forget the spare wheels for breakdowns, extra carts for lime, sand, timber, water, straw etc., and the constant adaptation to inclement weather and boggy roads, while no matter what the conditions the animals needed stabling, food, and water.[25] All took time and space. Problems would have multiplied had they attempted to increase the number of men and the speed of the works. Small teams would have been best on most sites, especially in towns where streets were narrow, space a premium, and the locals needed to get on with their lives in the meantime. Thus, fatty mortar ensured that short-term contracting was the norm.

I have illustrated the dozen-course Standard Maximum in the westworks of Saint-Denis and Chartres by dividing the elevation into as many sections as there were seasons between start and finish. The junctions are not arbitrary: they were chosen to coincide with the lithic evidence. The narthex at Saint-Denis would have been built in a dozen years, and perhaps 15 when we include the footings. The westwork at Chartres, not including the spire, could have been built in 20. With so few documented buildings,[26] these dates are of the utmost importance for historians.

24 James, "Timetables."
25 James, "What Price," 51 and James, *Contractors*, chapter 6.
26 James, *The Ark of God*, 1:7–10, 3:25–42, and 4:4–7; James, "An Investigation."

1.2 *Saint Denis Narthex*

Erwin Panofsky in 1946 suggested that "plans … were under way as early as 1125."[27] The document has since been reinterpreted many times so that Sumner McKnight Crosby and others preferred the mid-1130s.[28] In 1998, Lindy Grant, in a comment on the charter of 1125 that "relieved the townsmen of the death tax, in return for a gift of 200 livres to renovate …," reopened the possibility that the narthex could have been started in the 1120s.[29]

The intimate connection between Abbot Suger and the crown allowed him to "exploit every political opportunity to press the claims of his Abbey, especially during the threat of German invasion in 1124, but also when King Louis VI wanted his sons crowned as associate kings in 1129 and 1131." Meanwhile, "the bloodless French triumph of 1124 allowed Suger to make vast claims for the abbey."[30] Grant continues to argue that "what Suger says about the episode is important because it is often seen as a defining moment in the development of Suger's political theories," and Suger was able to present the Capetian king as the man who can "do homage to nobody." In return, Louis "issued a new charter in favor of the abbey, assigning to it substantial rights of jurisdiction" over the Vexin.[31]

In a building analysis I wrote, "working back from (the consecration of 1140) and taking into account the minimum time needed for construction and mortar-setting," the portal sculpture should be dated to 1130, and earlier for the footings.[32] In 2011, Clark and Waldman suggested "the recovery of the priory at Argenteuil in 1129 … [was] closely linked to the plans to enlarge the abbey church."[33] The full depth of the footings has not been investigated,[34] but must have been substantial as there is little sign of settlement. I assume at least five meters to a firm bed of *marle*, perhaps 20 courses. It would be reasonable to consider three seasons to demolish anything that was in the way, set out, dig and build the footings, from which I suggested that the time required to dig and build deep footings through silt and *marle* to a firm foundation indicated a start around 1126/27.[35]

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27 Panofsky, *Suger*, 150.

28 Crosby, *The Royal Abbey*, 123–24.

29 Grant, *Suger*, 241–42.

30 Grant, *Suger*, 109.

31 Grant, *Suger*, 113.

32 James, *Ark of God*, 5:1173–74.

33 Clark and Waldman, "Money."

34 Gerson, "The Lintels."

35 *Marle* is a highly compacted calcareous clay. James, "Boundaries," 23–46 and fig. 9, and updated in https://www.academia.edu/20199130.

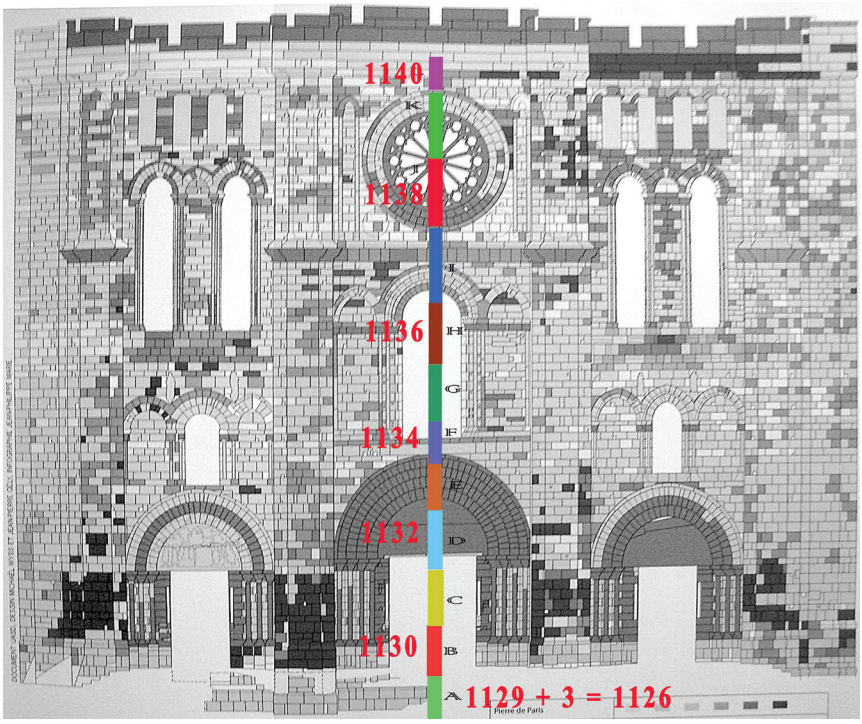

FIGURE 7.2 Saint-Denis, Abbey Church: west elevation with campaigns marked and dated by working downwards from the consecration of the upper chapel in 1140

In 2020, Jacques Moulin considered the commencement of the narthex as "l'apport financier exceptionnel de 1125 pourrait alors correspondre .... d'un véritable agrandissement du bâtiment."[36] It seems we are settling on 1126±1 for the start of the works. The carving of the earliest portal sculpture could then be dated to 1129±1 and may have been extended during the following seasons as the sculpture was gradually placed during the three building campaigns required for the encasing masonry.[37] Between the completion of the upper vaults in 1140 and the above estimate that work commenced 15 years earlier, I divided the work into 15 phases (Figure 7.2). The junctions are approximate as no complete toichological study has yet been undertaken to pinpoint exactly where each master stopped and the next began.[38]

36 Moulin, "Saint-Denis," 358.

37 James, "Narthex of Saint-Denis."

38 Toichology is the study of existing stone structures. Formulated in James, *Template-Makers,* 36 and 207; belittled by Russell, 9. See my response "In Defence of Toichology," 9.

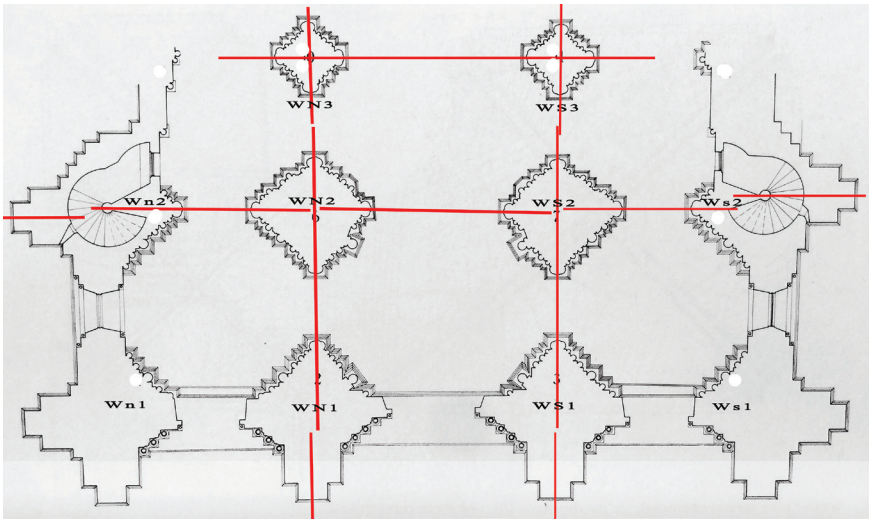

FIGURE 7.3 Saint-Denis, Abbey Church: narthex plan with axes marked in red (image based on Crosby)

With many different teams appearing for a few months and then moving on while the mortar set and the client gathered his finances, it is no wonder that Suger makes no mention of the masters. He talks of glaziers and goldsmiths, but not of masons or carpenters.[39] Panofsky bewails this omission, but this is no more than the inevitable reticence that would follow a seasonal turnover of whichever builder happened to be available each time.[40]

Moulin calculated 450 stones per course, or about 3000 per campaign employing 30 to 40 masons.[41] Allowing a dozen years from pavement to chapel, 92 courses were laid at an average of seven courses per season, somewhat less than the Standard Maximum.[42] The erection of seven courses could have been completed in a few months, leaving time for the crew to work on other sites before winter.

Toichology can locate where decisive changes were made, where a new master took over and thus where work paused between seasons. The following three anomalies were found from a superficial investigation:[43]

Axes are out of alignment with the porches and with each other, most noticeably around the stairs (Figure 7.3); those between the W2 buttresses are offset

39 Gely and Wyss, "Building Stone," 82.

40 Gardner, "Two Campaigns."

41 Moulin, "Saint-Denis," 358; James, "Timetables," 4 and James, "What Price," 47–66; James, "How Many," 23–24; Olsen, "Standardizing Production," 189 n. 1.

42 In the choir the construction rate was the same, James, "Could Suger?"; James, "Saint-Denis Chevet."

43 James, "The Narthex of Saint-Denis" and in James, "Portal Impost," 21–23.

FIGURE 7.4
Saint-Denis, Abbey Church: central door, upper left jamb

FIGURE 7.5
Saint-Denis, Abbey Church: central door, upper right jamb

to the west, and were set out for different bay dimensions; and in the second bay the newel of the north stair is aligned on the axis through the piers whereas the newel through the south stair is aligned on the middle of the external buttress. The space allocated to the side portals was 30 cm less on the north than the south. All this suggests work was more advanced on one side and therefore the plinths were set out in different campaigns by men with different attitudes to where the axes ought to have been.

In the west portal, the left jamb of the middle door the figure has lost its canopy, though one stump is still visible under the eagle. Above it, the impost was adjusted to make room for the head (Figure 7.4). The right jamb is similar (Figure 7.5). The removal of the canopies reduced the height by about 14 cm. The cut stones show the decision to alter the height was made partway through the sculptural program. The upper part of the jamb to the south door was also vandalized where the enclosing circlet was reduced by a similar amount (Figure 7.6). Assuming three campaigns in the footings, the masters of

FIGURE 7.6 Saint-Denis, Abbey Church: south door, upper left jamb

this seriously compromised area were E and F (Figure 7.7). There was a similar situation in the Chartres portals.[44]

The imposts on the interior of Saint-Denis are just as complex. WN2se has three profiles next to each other (Figures 7.8 and 7.9). The junction between yellow and blue is covered by a little cartouche, the other junction between blue and green is "lost" in the corner. As each impost was carved from a template, we should expect to find a number of masters involved. Most of my readers will have enough knowledge of this building to recognize that, if this level of observation was to be applied throughout and assembled in models or isometrics, we would start to resolve some of the problems that bedevil the history of this important building. Meantime the divisions into five and eight course sections remains a reasonable approximation.

44 James, "Colonnettes Vandalised."

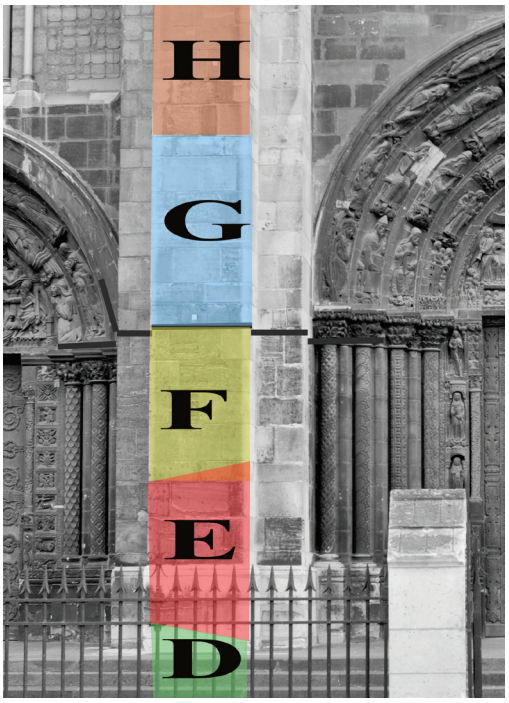

FIGURE 7.7
Saint-Denis, Abbey Church: buttress between north and central doors with approximate campaigns marked

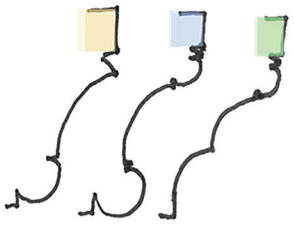

FIGURE 7.8
Saint-Denis, Abbey Church: imposts to south-east capitals on WN2 pier

FIGURE 7.9 Saint-Denis, Abbey Church: capitals in WN pier with imposts carved from three templates, colored

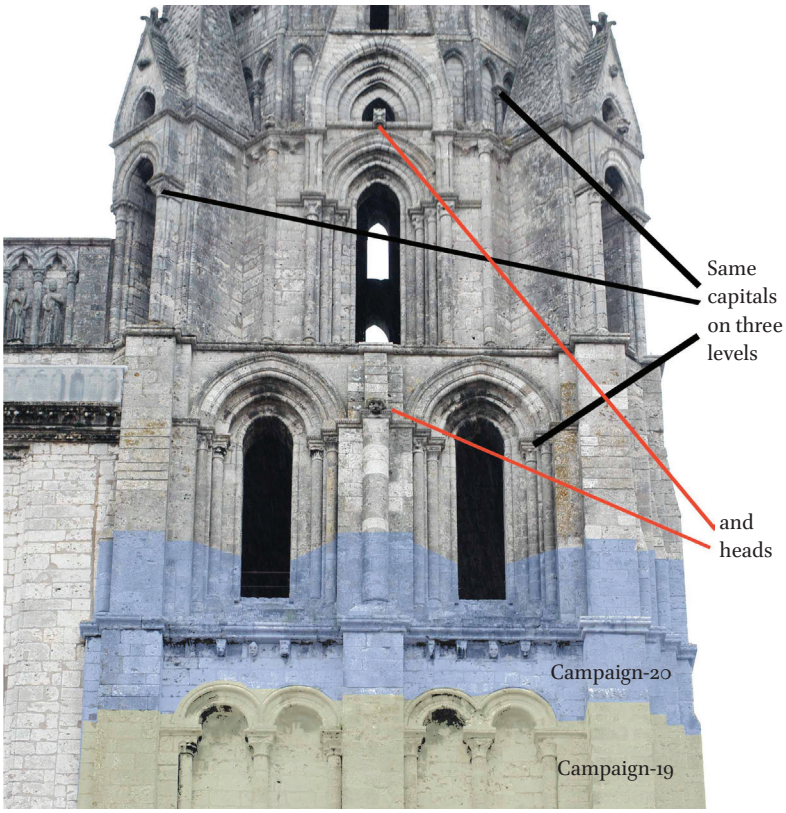

FIGURE 7.10 Chartres, Cathedral of Notre-Dame: south tower third level and spire, showing the three upper levels with similar capitals and heads, and above the blue the changes to the buttresses

1.3 *Chartres Westwork*

To establish the dates for the Chartres towers, as with Saint-Denis, start at the top and work down. There is a clearly marked junction halfway up the third level of the south tower where the buttresses were altered in shape and size (Figure 7.10). Above this the master prepared for an octagonal spire. It was a momentous change from square to octagon and from solid forms to a sharply pinnacled design quite different to anything below. I suggest the junction occurred when funds were diverted for the coming crusade, which would date it to 1146.

By the time work was resumed in the 1150s there may have been new people in charge of the cathedral, holding different views and deeply influenced by the many who journeyed far from home. The decision to radically transform the work above the junction into an octagon represents a significant redesign.

FIGURE 7.11 Chartres, Cathedral of Notre-Dame: model of western towers with campaigns marked and dated working downwards from the transition from square to octagon in the upper stage of the south tower in 1146

Octagonal spires usually bespeak the 1150s or later. The possibility of a crusader recession in the building industry can be noted in Count Galeran's more than ten-year delay in fulfilling his promise to build 17 spires,[45] over half of which were octagonal.

There is further confirmation in the style of the capitals that suggest a different period. They are less austere and more intimate,[46] and with the nearby projecting heads suggest the same hands remained on site for at least the first three seasons of the spire building program. Working downwards from this junction and noting the changes level by level, the towers may be divided into campaigns of a dozen courses or less, close to the Standard Maximum (Figure 7.11). It has been shown that the masons marks in the stairs connect the middle phases of the north tower with the lower campaigns of the south.[47]

45 Promised in 1146, and delayed until 1157–63, James, *Ark of God*, 5:1758–59; James and Gardner. For the recession James, "Master GrippleSon."

46 Illustrated in James, "Boundaries," 34–36; James, *Ark of God*, 4:369–84 and the 57 capitals in https://www.creationofgothic.org/COGA/capitalphases.php?id=CHARTRES.

47 James, "La construction du narthex"; James, "Chronology."

This analysis offers a rather neat history in which the north was begun in the mid-1120s contemporary with its "twin" in Saint-Denis, and the south not begun until after the fire of 1134. The entire program below the junction was executed under the guidance of one man, Geoffrey of Lèves,[48] just as Saint-Denis was guided by one man, Abbot Suger. Though no documents report these powerful men meeting to discuss their projects, the timing and the common elements in their programs does suggest a shared vision.

Footings are underestimated in most histories of medieval buildings. The amount of material that would have been removed for the footings of one tower was about 3500 cubic meters. With our mechanical equipment this does not sound very large, but then the earth had to be spaded out, hoisted in buckets, tipped into barrows, wheeled some distance, and dumped, possibly to make the bishop's garden.[49] Excavations in *marle* need little shoring as it is usually self-supporting while stepped footings would have considerably enlarged the excavations. The masons stand within the footings to lay the ashlar and as the space was filled could stand on the filling to lay the next course. I suspect the footings would not have been less than six or seven meters to well below the crypt floor.[50] The exit from the west end of the Fulbert crypt at Chartres probably had stairs into the fore porch that had to be demolished (Figure 7.12).[51] Together with the difficulties of working below ground, this would have been a slow job. One season for planning and excavation with demolition of whatever was in the way, and three to ground level.[52]

Though every history of Chartres presumes the fire of 1134 marked the start of the north tower,[53] Philippe Debaud has convincingly shown this was an error.[54] The document refers only to fires in the town with no mention of the cathedral but notes possible damage to the Hôtel-Dieu located where the south tower now stands. Assuming campaigns followed one another without pause, the footings in the north would have been begun around 1126±. In this sequence, no sod was turned for the south tower until Campaign-8, which conveniently coincides with the date for the fire, and may even have been triggered by it.

48 Grant, "Geoffrey of Lèves."

49 Map in James, "Side Lintels," 4; Salzman, *Buildings*, 82–88.

50 Salzman, *Building*, 24–27.

51 Model of each campaign, by Alain Menager: https://www.creationofgothic.org/COGA/models.php?id=CHARTRES&phase=11; Lefèvre-Pontalis, "Les façades"; James, "Towers," 4; Fels, "La façade," 232–33.

52 Debaud, *Maîtres Tailleurs*, 34.

53 Lepinois and Merlet, *Cartulaire*.

54 Debaud, *Maîtres Tailleurs*, 36–42.

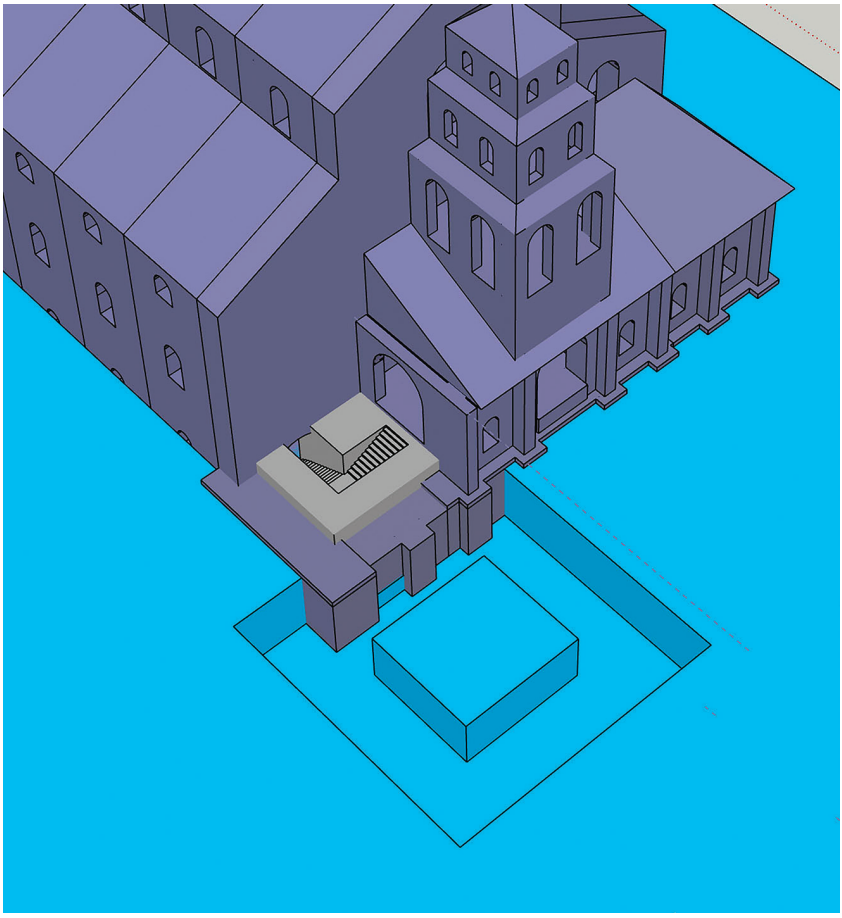

FIGURE 7.12 Chartres, Cathedral of Notre-Dame: model of the west end Fulbert nave with lower part of the fore porch to show the stairs from the crypt and the excavation for the north tower

1.4 *Exceptions*

Nevertheless, there were times when speed was essential such as the security of the realm. Château Gaillard and the Welsh castles were built rapidly, as were great fortresses, town walls, and other urgent military programs. Royal works could impress labor and had loads of money not usually available in the churches we examine. These were massive undertakings, often engaging a thousand men who were fed and accommodated through royal fiat, many more than the relatively modest numbers found on church sites.[55]

55 Knoop and Jones, *The Mediæval Mason*, 494–519; Harvey, *The Master Builders*.

Castles and city walls had little ornament to slow down the works and the middle of the walls may have been filled more carefully than in the churches to improve security against bombardment. It may be that mortar beds were kept thin and stability relied on the quality of the stone cutting rather than mass. Unlike most churches in towns and cities, the sites around fortresses were cleared and would have had ample room for offloading and storage. Beside an urgent need to guarantee the safety of the realm, these considerations do not in themselves explain how they were able to erect enormous and well-funded structures so rapidly. Further study is needed.

2 Measure

The second and perhaps major limitation to medieval practice was the lack of measure. We can easily underestimate the fundamental importance of this simple matter. Not even slow-setting mortar had a greater impact on the industry. The modern tradesman expects plans, shop details, and specifications that are possible only because we enjoy a universally recognized unit of measure. But before the French revolutionaries replaced the old units there were as many different lengths as there were towns or guilds or masons.[56] Every town and every trade had their own measures. We have been misled into thinking that the occasional references to the Pied du Roi, the Canne de Marseilles, or the Roman foot referred to standards that would be the same everywhere to the millimeter.[57] Even in royal works not every master used the royal foot.[58] Most masters would have had "their own" unit for small elements like windows and doors[59] and for contracts and setting out,[60] but they were personal and no two were alike.

56 Nelson, "Foundations"; Zupko, *Measurement*; Wenzlhuemer, "Standardisation"; James, *Measure*.

57 James, *Contractor*s, 565–66; James, "Medieval Units" now needs rewriting.

58 Roman foot used in the lower chapel, James, *Template-makers*, 70–71, and n. 10; updated https://www.creationofgothic.org/COGA/files/articles/Geometry-Sainte-Chapelle.pdf; Murray, "Sainte-Chapelle."

59 James, "Geometry XII-C, the triforium passage doors," *Contractors*, 250; James, "Medieval Units."

60 Salzman, *Building*, appendix B.

Medieval presentation drawings were usually to scale, but without dimensions they are not working drawings.[61] They are suitable only for client presentation. To build anything more than a shed, precision is needed. François Bucher observed, "Of over three thousand medieval drawings less than ten contain measurements, and even these as in the St Gall and Cologne plans seem added later."[62] In the 1340 Sansedoni elevation, dimensions were marked, but in Roman numerals,[63] a system of numbers that made calculation a nightmare and division impossible.[64] Bucher suggested "measurements are dirty within the context of geometry which is an affair of forms in the mind. It is *scientia* and not *ars.*"[65] In the Villard de Honnecourt manuscript, there is nothing that could be called a working drawing.[66] It is a myth that these could be used by tradesmen.

How often does a picture show a mason holding a plan? They hold square, compass, or dividers, but seldom a drawing. For more than a thousand years drawings were for the client, templates for the men.[67] Beyond directing the men so they could cut stone to the accuracy of a millimeter, precise communication between masters was impossible. Without dimensioned drawings neither master nor client could be held to any earlier plan.[68] The beautifully crafted but dimensionless elevations for the west tower of Strasbourg were quickly replaced,[69] and among the many drawings Michelangelo made for St Peters and Wren for St Paul there are no dimensions.[70] Wren's model was perfect to convince the client and maintain the design through many years, but did not have the level of precision needed by masons. Such models and elevations were usually futile attempts to bind the future against the inevitable changes that the next master could make.

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61 Turnbull, *Tricksters*, 60–63; Few understand the different functions of detailed and dimensioned drawings, including Harvey, *Craftsman*, 119; Shelby, "The Role of the Master" and "Templates," 146; Branner, "Villard de Honnecourt"; Toker, "Remote Control," 70–72 nor do some authors in Wu, *Ad Quadratum*.

62 Bucher, "Design Methods," 51 n. 38; Turnbull, "*Ad Hoc*," 321.

63 Toker, "Remote Control," 70 and 85.

64 Boyer, *Mathematics*, 280.

65 Bucher, "Design Methods," 49.

66 Harvey, *Gothic World*, 34–36 on the earliest drawings, and not one has a dimension.

67 Turnbull, "*Ad Hoc*," 322.

68 Turnbull, *Tricksters*, 66–69; Salzman, *Building*, 19.

69 Michael Parler's drawing for the Apostles Gallery at Strasburg 1385±, in *Musee de l'Oeuvre Notre-Dame*, Strasbourg.

70 Geraghty, *Wren*; Brothers, *Michelangelo*.

At Chartres, Master-11 set the width of the Royal Portal as one sixth more than the width of the north tower. He measured this ratio from the second course in the tower, which was level with the portal threshold. At the same time *imagiers* carved most of the portal sculpture.[71] As the footings for the south tower were still being dug, he could place only the northern plinths. If there had been an instruction from the supervisor to the next master, it need not have been more than "the portal is six fifths the width of the tower." The next master followed this to place the other plinths, but measured it across the fourth course that was at eye level, instead of the second. At this level the tower was narrower, so the same ratio shrank the portal by 40 cm. This one miscommunication prompted the cascade of changes that have fascinated historians ever since.[72]

We can see immediately that this instruction was not sufficiently precise. Being able to leave only rudimentary instructions for their successors, the next master could not continue with the previous man's intention, and change was inevitable. This practice developed a mindset in which alteration was acceptable the moment a better idea was offered. Consequently, combined with the Standard Maximum, there were few if any opportunities for one man to create the entire work from start to finish as we expect today. Medieval construction was remarkably like Holton's description of modern science as "more like participating in a building project that has no central planning authority, where no proposal is guaranteed to last very long before being modified or overtaken, and where one's best contribution may be one that furnishes a plausible base and some useful materials for the next stage of development."[73]

3 Geometry

Geometry was the language of the trade and was the only way to instruct without measure. Medieval architecture is inconceivable without geometry, which has also been the foundation for all the arts across the centuries, in manuscripts, painting, and woodwork.[74] Geometry bridged the gap between ideas and execution. It created order with procedures that were easily remembered. The procedure was guarantee against accidents on site, and any template could

71 James, "Lower Lintels," 8–12 and "Ratios," 5–8.

72 James, "Chronology," and other articles in *The Royal Portal Series* in COGA.

73 Holton, "Do Scientists?"; Turnbull, *Tricksters*, 55.

74 Among many, Stevick, "Harburg Gospels"; Wade, *Geometry*; Adam, *Construction*.

FIGURE 7.13
Reims, Cathedral of Notre-Dame: tomb of Hugues Libergier

be accurately reconstructed after broken string lines, storm damage, or carelessness. It was so basic to the master's role that their tools were designed exclusively for the geometry needed to form the templates.[75] Three of the most important, the rod, the square and the proportional dividers, were inscribed onto the tomb of Hugues Libergier (Figure 7.13),[76] with only the compass missing.

Medieval geometry was neither Euclidian nor theoretical, but practical. It meant the masters did not have to be numerate for they used ratio where we would use scale. Theirs was the "non-mathematical technique (of) constructive geometry,"[77] which is why there were no rulers divided into feet and

75 Shelby, "Geometrical Knowledge," 395–421, 418; commentary to V39, V40 and V41 in Bucher, *Architectorm*, 118–27; Salzman, *Buildings*, 339–41.

76 James, "Hues Libergier"; Wu, "Hughes Libergier"; Morgan, *Canonic Design*.

77 Shelby, "Geometrical Knowledge," 397.

inches. There was no computational math, just "shapes that mattered more than calculation."[78] The masons would have seen the world through these tools just as we see ours through shop drawings and CAD and would have relied on geometry to the same degree that we rely on tape measures and computers.

The development of Gothic shows they thought in geometry, as should we if we are to be their historians. The pattern book by Mathes Roriczer starts "If you want to draw a base plan for a pinnacle .... begin by making a square"—but how big?[79] Lorenz Lechler answered this by starting his geometry for a window with "the wall thickness, whether it be small or large, and draw ..." and proceeded to "extract" from the wall all the templates for the window.[80] The wall thickness was his benchmark.

Partially completed elements like ribs were not always continued as masters often changed profiles and elements partway up. The ubiquity of these changes has been explained by the extraordinary assumption that masons constantly changed their minds. Their training in using geometry to make the templates would have made that somewhat unlikely.[81] The masters spoke to their men through templates. They "were the primary instruments of the trade,"[82] as in Lincoln today (Figure 7.14).[83] They were accurate, replaceable, and repeatable. The template ensured that stones carved in the shop fitted exactly on site.

The procedure for creating a template had a magical quality, for with a few quick movements the master would conjure out of his mind something that accurately foretold the future. Wizardry added a gloss to his reputation, as we read in the many encomiums to the great art.[84] In Bucher's words, "As God Himself becomes the *Artifex Principalis* it is not therefore surprising that [the master] becomes the doctor *lathomorum, sapiens architectus, vir peritissimus.*"[85]

No matter what element he was planning, be it pinnacle or nave, the procedure grew from some other part being already in place to kick-start the geometric process. Dimensions, *per se*, were not needed. The technique is as ancient as surveying that has always required benchmarks to determine location and orientation. In the Chartres westwork the master may have used the west wall

78 Shelby, "Mathematical Knowledge"; Shelby, "Geometrical Knowledge," 420.

79 Shelby, *Design Techniques*, 84. James, "Pinnacles," 55–59; Turnbull, "*Ad hoc*"; Cohen "Provocative Similarities." https://www.academia.edu/38919814.

80 Shelby, "Templates," 149.

81 Shelby, "Education."

82 James, *Template-makers*, 2.

83 James, "Techniques of Perfection," *Ark of God*, 3:17–24.

84 Harvey, *Gothic World*, 27–31.

85 Bucher, "Design Methods," 49; Pevsner, "Architect"; Shelby, "Education," 1–26.

FIGURE 7.14 Lincoln, cathedral carvers lodge, the two templates on this stone will be used to mark the upper and lower outline, and the transition is formed between them by hand

of Fulbert's cathedral as his benchmark, it being the nearest antiquity. There is a whole-number ratio of 5–6 between the old nave and the width of the new work.[86] The numbers are simple, and amidst rain, scaffolding, and mud, simple ratios were best, if somewhat more prosaic than we might hope. Only geometry enabled masters to direct their men with precision.

3.1 *Consequences 2*

Over the past 55 years I have not only visited but obtained the keys and climbed over a thousand churches in France, and hundreds more in England,

86 James, "Lower Lintels," 8–12 and "Ratios," 5–8.

Italy, Spain, and Germany.[87] In every one I have applied toichological analysis to the stonework to locate changes in profiles and elements. The book I published from this study, *The Template-makers of the Paris Basin* (1989), was dedicated to demonstrating that "a change to the technical forms, in profiles and elements will usually direct us to the location of the junction between one master and the next,"[88] for they reflect changes in the templates from which they were carved that themselves reflect the geometry from which they were designed.

The issues of subcontractors and site control will be discussed anon, but to summarize the argument so far:

– Fatty mortar limited building operations to a season.
– Without dimensions accurate details could not be shared.

These are the grounds from which all else follows:

– Only the template enabled a master to pass exact information to his men.
– Each template was created using personal geometric processes.
– Changes to templates indicate the junctions between campaigns.

Toichology allows us to determine that the outcome, developed over the centuries, was that contracting was intermittent and seasonal, and that template-makers were not in permanent employment but moved from job to job.[89] There was no reason for a client to wait for the previous team to be available when another was free to start immediately. Indeed, we should not expect the same master to be free to return in the next season as by then he could be hundreds of miles away on another job. Come the next season, clients would employ whoever was available.

Once an element had been started, successive masters continued the ideas begun by predecessors in a process of surrender rather than dominance. He gave in to what he inherited, made no attempt to rebuild what he had been given, and simply continued the earlier masonry to the next stage. That a master was employed one season at a time added to his luster for only his skill allowed him to take over from another, divine the earlier intentions and continue the work with the same precision. His role inspired awe, for with only rudimentary instructions he could direct a body of men to create ever more beautiful and spacious buildings. In a sense, he was like a god who brought

87 The Survey in James, "An Investigation," 13–46 and expanded in James, *Template-makers*. For a map of the 1,555 churches in the Paris Basin from before 1250 see https://www.creationofgothic.org/COGA/map.php?srch_for=&page=&srch_importance_1=1&srch_importance_2=2&srch_importance_3=3&srch_importance_4=4.

88 James, *Template-makers*, 36.

89 "Masters travelled far and wide," Harvey, *Gothic World*, 50; also n. 19 above.

order out of chaos, who came from afar and resumed complex operations without hesitation. If he had been permanently employed, he may have lost this aura. Where permanence could have turned him into a functionary, intermittent contracting turned him into a mystery. His role was truly, in the spiritual sense, "in service." The new master served the intentions of the one before, who was himself in service to whoever was before him. As long as service rather than gain illuminated the master's role, we should regard these men as craftsmen rather than architects. Gervase of Canterbury implies that the master had to be in personal attendance all the time, and when he could no longer meet with the men face to face, he had to give over to another.[90] Thus, no master could supervise more than one job at a time unless it was round the corner. Daily direction could not be left to someone who visited the site three or four times a year, as described for a later period.

Intermittent contracting allowed enormous diversity. It provided opportunities for the most skilled and creative to make some contribution to many buildings, inserting their brilliance into one church after another. Similarly, dull or mediocre builders were involved with only a part of the whole. It spread a little genius across a greater number compared to nowadays when most buildings languish under the control of mediocre men with little flash of creativity to be found. I know which contractual system I would prefer, though it does make our job as historians somewhat more difficult.

Small peripatetic teams were the basic unit of the construction industry. Masons and their families may have formed a new class of citizen only lightly encumbered with feudal ties and duties, and with closer allegiance to their master than their lord. "The fluidity of labour helps to account for the rapidity with which variations in architectural styles and fashions spread."[91]

John Harvey wrote, after years among the documents, that it was usual that masons and erection gangs "were laid off when the frosty weather began and the unfinished walls were protected with a covering of straw."[92] No matter how varied the scope of the work, there could be little lifting, mixing of mortar, or on-site construction during the winter when the stones froze and the frost was daunting. Winter could be hard for three months, and though we refer to the 12th century as a warm period, the average was in fact "0.35° C cooler than the last thirty years."[93] Some clients may have maintained a warm shed for a few *imagiers* during the winter, but seldom the more numerous masons,

90 Stubbs, *Gervase*.
91 Salzman, *Building*, 35.
92 Harvey, *Gothic World*, 17.
93 Bradley, "Climate," 404–05; James, "Boundaries," 28–32.

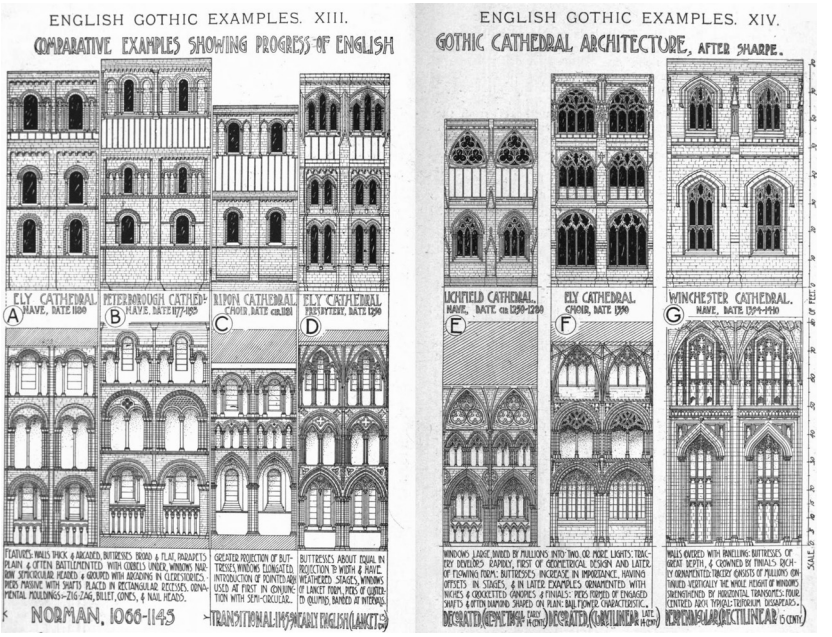

FIGURE 7.15 Banister Fletcher, a typical page to show thematic variations on elevations

laborers, or quarrymen.[94] Then what?—did the men go home? move to another task? bring in the harvest or go fishing?

4 The Canon

How did the master decide the elements themselves: the columns and arcades and structure that collectively form the appearance of medieval architecture? For example, between aisle and clerestory there were only four alternatives: window, plain wall, gallery, or triforium. The gallery was like an aisle in the sky, the triforium a dado with a passage and the clerestory an enlarged aisle with windows on both sides. This is the Canon "of such simple flexibility that left room for variation and irregularities."[95] The concept should not surprise those of us who were taught through Banister Fletcher (Figure 7.15).[96]

94 Salzman, *Building*, 57–62; Knoop and Jones, *Mediæval Mason*, 132–34; Shelby, "Monastic Patrons"; Colvin, *Building Accounts*, 38.

95 Bucher, "Design Methods," 41.

96 Fletcher, *Architecture*, 136–37.

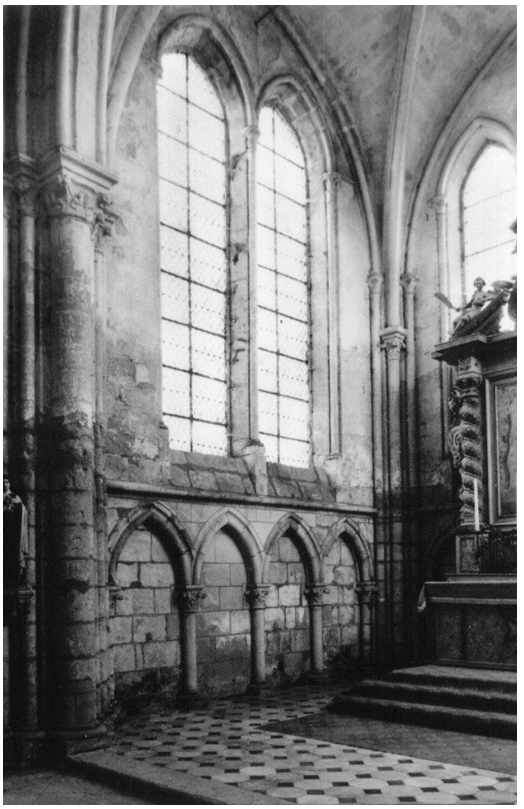

FIGURE 7.16
Priez, Saint-Jean-Baptiste: apse interior

In most cases, all the mason, patron, and client had to do was select which element to build next. Discussion would settle the issue and the appropriate element would be chosen from the Canon and the master unleashed to get on with it. The apse in the small church of Priez can be divided into piers, dado, windows, and vault (Figure 7.16). Each part could be visualized as separate units from the Canon. They were the same in the smallest (Courville, Figure 7.28) and the largest (Chartres). It was not essentially different in the more complex buildings except these four units could also be repeated in all directions and across all surfaces.

From the point of view of design, Chartres, Laon, and Reims were, for all their magnificence, just assemblies of repetitive elements from the Canon detailed in personal ways. The genius lies in the proportions and detailing provided by the masters, and consistent long-term control that we will discuss in a moment. The process was not unlike biology in which complex structures are created out of a few simple components that can be scaled up or down and

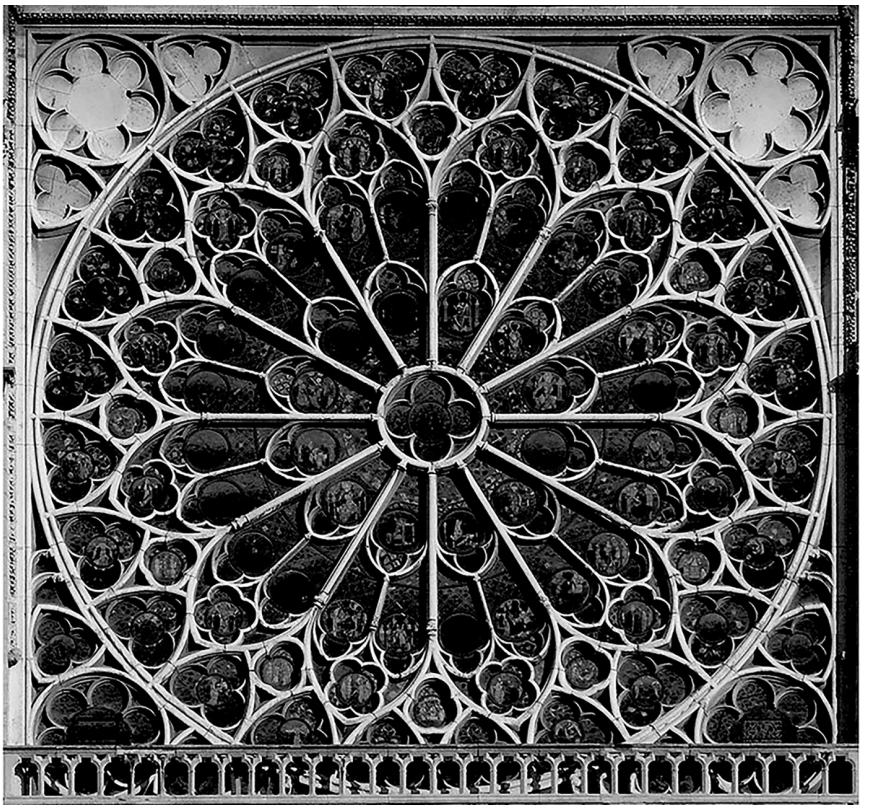

FIGURE 7.17 Paris, Cathedral of Notre-Dame: south transept rose window

repeated endlessly.[97] This was why Jean Bony referred to Gothic as "an elaboration of prototypes,"[98] and Stephen Gardner a "synthesis of features already existing in the local milieu."[99] Choosing items from the Canon was the simplest way to contribute to the design and produce variation through the compilation of standard parts. The complexity of the great rose window in the south transept at Notre Dame in Paris (Figure 7.17), was assembled from only seven items themselves made from only three forms (Figure 7.18). The richness comes from multiple variations of a small toolkit, typical of the best in the Canon method.

The limited choices in the Canon made design easy. Among hundreds of windows and vaults inscribed into pavements note what has been left out.

97 Turnbull, "Gothic Laboratory," 6.
98 Jean Bony, *French Gothic*, 285.
99 Gardner, "Centripetal Implosion," 111–18.

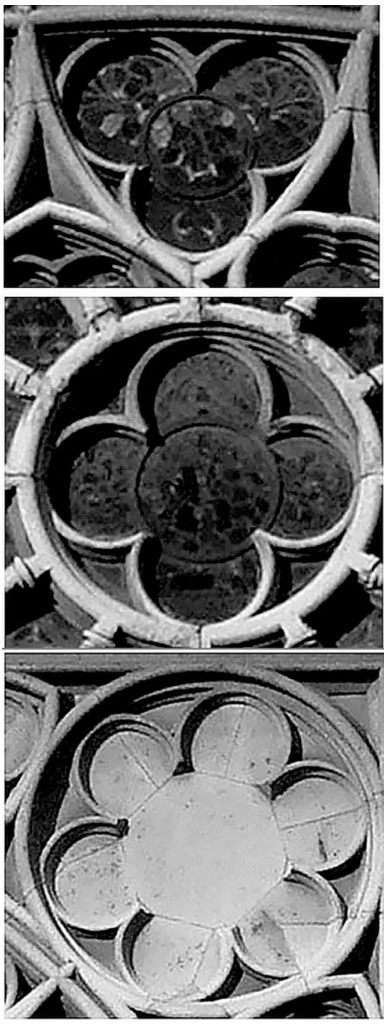

FIGURE 7.18
Paris, Cathedral of Notre-Dame: south transept rose, three simple shapes assembled to form great complexity.

There are none for an entire building, or even a single bay. There are none for elevations or portals or triforia, while tracery and ribs and arches exist in droves. The omitted items come from the Canon and were repeated so often everyone knew how to proceed, whether the most skilled or the least. In smaller works the design may have been assembled by the priest, the donor, a committee of elders, or a local mason, just like today. It was in these contributions that originality was most likely to occur. Each selection could be detailed in as many ways as there were masters, as at Saint-Martin-des-Champs where the freedom to interpret the Canon got out of hand. The piers consist of a dozen

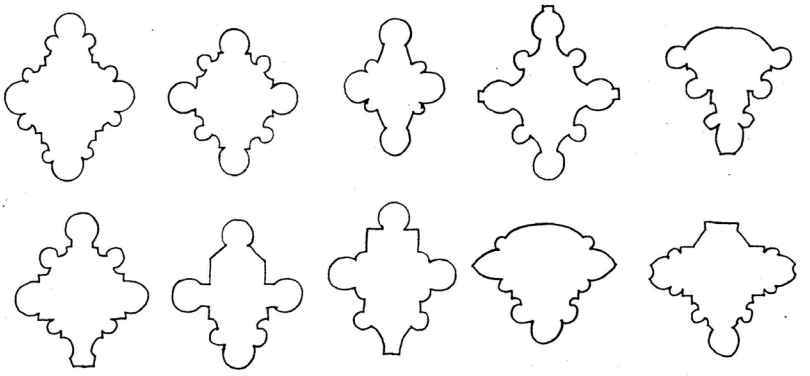

FIGURE 7.19 Paris, Saint-Martin-des-Champs: plans of piers for comparison

uncoordinated forms designed by different masters who disregarded each other and defied any opportunity for unity (Figure 7.19).[100] There was clearly no professional in charge.

In most buildings the creative decisions were few, leaving considerable time for the master to carve alongside his men in small jobs and to add administrative tasks in the larger.[101] The standard forms in the Canon saved thinking, while allowing for individuality. It was much simpler than having to invent everything from scratch. We have appreciated the Canon in manuscripts and icons, but we have not explicitly recognized the same situation in architecture. Thus, only the Canon made unified design possible, and permanent design control unnecessary. We still do the same, as in the modern bathroom that is an assembly of bath, toilet, basin and a few fittings. These comprise the Canon for our smallest room, for which catalogues offer wide choices of shape, colour, cost, etc. We select the parts and arrange them with a little originality. When the idea for a walk-in shower appeared, we were offered a new element to add to the Canon, and yet it still took more than a century for the shower to supplant the bath.

4.1 *Consequences 3*

The industries' response to slow-setting mortar and the Standard Maximum was intermittent contracting guided by the Canon, while the response to lack of measure was the gift of Geometry. These were the tools that allowed great buildings to be built in spite of the dislocations from short-term contracting. The Canon made form-selection easy. Geometry made on-site communication

100 James, "Duke Master," 3–6.

101 At Chartres the master would average one design decision a fortnight, James, *Contractors,* 547–48.

possible. Together they overcame the limitations imposed by mortar and measure.

As contracting was discontinuous, we can read the history of a building from the inevitable discrepancies created when one team replaced another. We can no longer assume permanent workshops or architects or genius masters or creative supervision—everything was multiple, mobile, and contributory. Terms like "regional influence" to describe the transmission of ideas, "stylistically advanced" or "retarded," are obsolete for there were only people traveling the countryside and carrying their ideas with them from job to job. Indeed, trying to use style as a basis for history is irrelevant. Once we recognize that, we can follow a man's trajectory across space and time through the work he left behind, as attempted in every study in the *Master Carvers Series*.[102] By studying the makers of the Canon we will unearth the men who created Gothic.

To remain true to the documents this analysis is limited to the boom years before the mid-13th century, and more precise dating will be essential to follow the slow development of the Canon.

5 Interlude 1: On Dating

Inadequate and often contradictory dating in the literature has prompted two evidentiary approaches to chronology. First, as many masters were involved on every site and each worked on many buildings during their lives, it follows that matching similar profiles across many buildings can locate where a master worked, as with M1.[103] Then the evolution of each man's ideas in those campaigns would help build a master's timeline, again as with M1. Real dates may be attached to occasional campaigns by reference to dated works like Saint-Denis, and the rest may be approximated. By repeating an iterative procedure with other masters, a global chronology will emerge. To start this process, I collected the profiles and elements of every church I visited.

Second, the capitals may be analyzed in the same way, perhaps more accurately as they were works of the moment,[104] quickly carved and usually of little theological importance. The forms created during the three generations before the 1180s were very personal and may have been lauded more by their peers than their clients.[105] They display the most extraordinary variety, seldom

102 Listed in https://johnjames.com.au/.

103 The dossier method in James, *Template-makers*, ch. 8.

104 James, "Time to Carve" https://www.creationofgothic.org/COGA/files/articles/19-Time-to-Carve.pdf.

105 James, "The Recognition."

disciplined by another.[106] Capitals were the happy outcome of the immediate now, and therefore likely to reflect the emotions and spirit of their period. The outcome has been the dates used in *The Template-makers*, the five volumes of *The Ark of God*,[107] and the COGA site that was created to efficiently analyze these hundred thousand images.

For years I had put much else aside to record every capital in the Paris Basin and became increasingly passionate about their skill and beauty. Initially I gathered similar designs, some by individuals (Bussiares) and some by teams (Strapper).[108] From that came 30 draft studies to illustrate the method while helping to greatly improve the dates.[109] Timelines for capitals in multistory buildings where the upper would have to be later than the lower, were particularly useful.[110] This analysis has isolated two secure watershed moments: the decade of the 1120s and the 1170s. During the first, archaic arrangements were universally replaced by the formal manner that was carved for the next 40 years and "by 1130 the pursuit of perfect regularity had become an obsession," while in the second "formal capitals were universally replaced by foliage derived from nature,"[111] the most important transformation in the sculptural arts during this period.

In seeking individual carvers, consider the remarkable capital in the north tower at Chartres with two eagles dipping into a bowl (Figure 7.20), which was repeated in Le Mans (Figure 7.21). Chartres is dated to 1132±2 from the above analysis on the westwork, and were we to apply a similar date to these bays in Le Mans it would be more meaningful than the "1145–58" in many publications. While certainty is not possible and the suggested dates preliminary, after working ceaselessly with this material for the past 40 years I believe this

106 One notable exception is Marolles-en-Brie, and the uniformity in many smaller post-1180 capitals.

107 James, *Ark of God*, v.1: ch.3 for after the 1170s; v.3: ch.6 for before 1130; v.4 for the formal between 1120–80; https://www.creationofgothic.org/COGA/files/articles/DatingProcedures.pdf.

108 When attempting to identify individuals (be they masters or carvers) it has been useful for me personally to give them names. At Chartres I used colors for the masons and a feature for carvers. In COGA I chose names that helped me remember, important as I have sorted (not as firm as identifying) over 230 modalities. Of these, over 50 appear to be individuals, as with the Duke team who may be explored in https://www.creationofgothic.org/COGA/newcarverspage.php?carverid=Duke&srch_attribution_1=High&page=thumbs.

109 *Master Carvers Series* in *COGA-The project-Articles.

110 For a few of the bigger buildings https://www.creationofgothic.org/COGA/files/articles/08-Construction-Timetables.pdf.

111 James, "Boundaries," 30–39; James, *Ark of God,* 1:11–37 and 3:27–29; https://www.academia.edu/38919814.

FIGURE 7.20 Chartres, Cathedral of Notre-Dame: capital in south entry into north tower, aisle level

FIGURE 7.21 Le Mans, Cathedral of Saint-Julian: capital on south nave aisle third pier

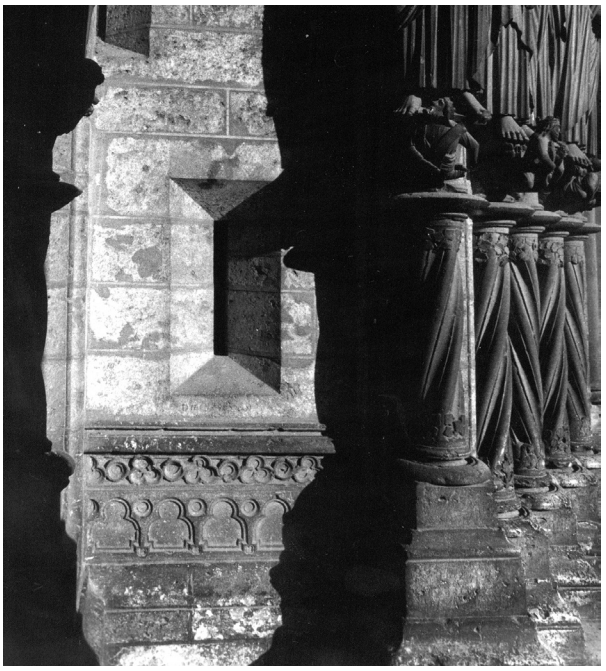

FIGURE 7.22
Chartres, Cathedral of Notre-Dame: south transept, pier between the north and central doors

FIGURE 7.23 Chartres, Cathedral of Notre-Dame: the last of four panels between the doorways in the transept porches showing the transition from plate- to bar-tracery

approach could place early medieval studies on a similar footing to that of the Italian Renaissance, for it will identify some of the key individuals and provide dates for their most important contributions and locate where they made

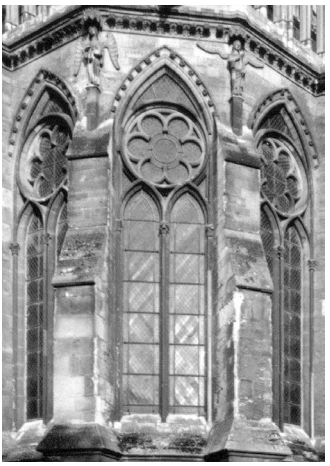

FIGURE 7.24
Reims, Cathedral of Notre-Dame: exterior of choir with tracery window

them, even though we will have to create their names.[112] The dates in the next Interlude come from the above analysis.

6 *Interlude 2: Altering the Canon Was a Slow Process*

New ideas invariably took a long time to evolve and be accepted. Bar tracery first appeared as a decorative item almost 30 years before it was used in a window, and even longer for the structural possibilities of ribs to be realized, and 50 years for the glazed triforium and for the full potential of *en délit* shafts.

Bar Tracery: Four small decorative items in the Chartres transepts that date from just before the turn of the century show the evolution of the concept of bar tracery (Figures 7.22 and 7.23).[113] It took years of gestation before the idea was explored in architecture, in five transept windows at Essômes.[114] It was years more before it was fully displayed in the great tracery of the Reims ambulatory (Figure 7.24). The concept was not taken up by others until the next decade in spite of the Reims windows being visible to many important dignitaries at the inauguration of King Louis IX.

112 https://www.creationofgothic.org/COGA/files/articles/A-revised-chronology-for-Early-Gothic.pdf.

113 James, *Contractors*, 188–90; James, "Prelude."

114 James, *Template-makers*, 154–63.

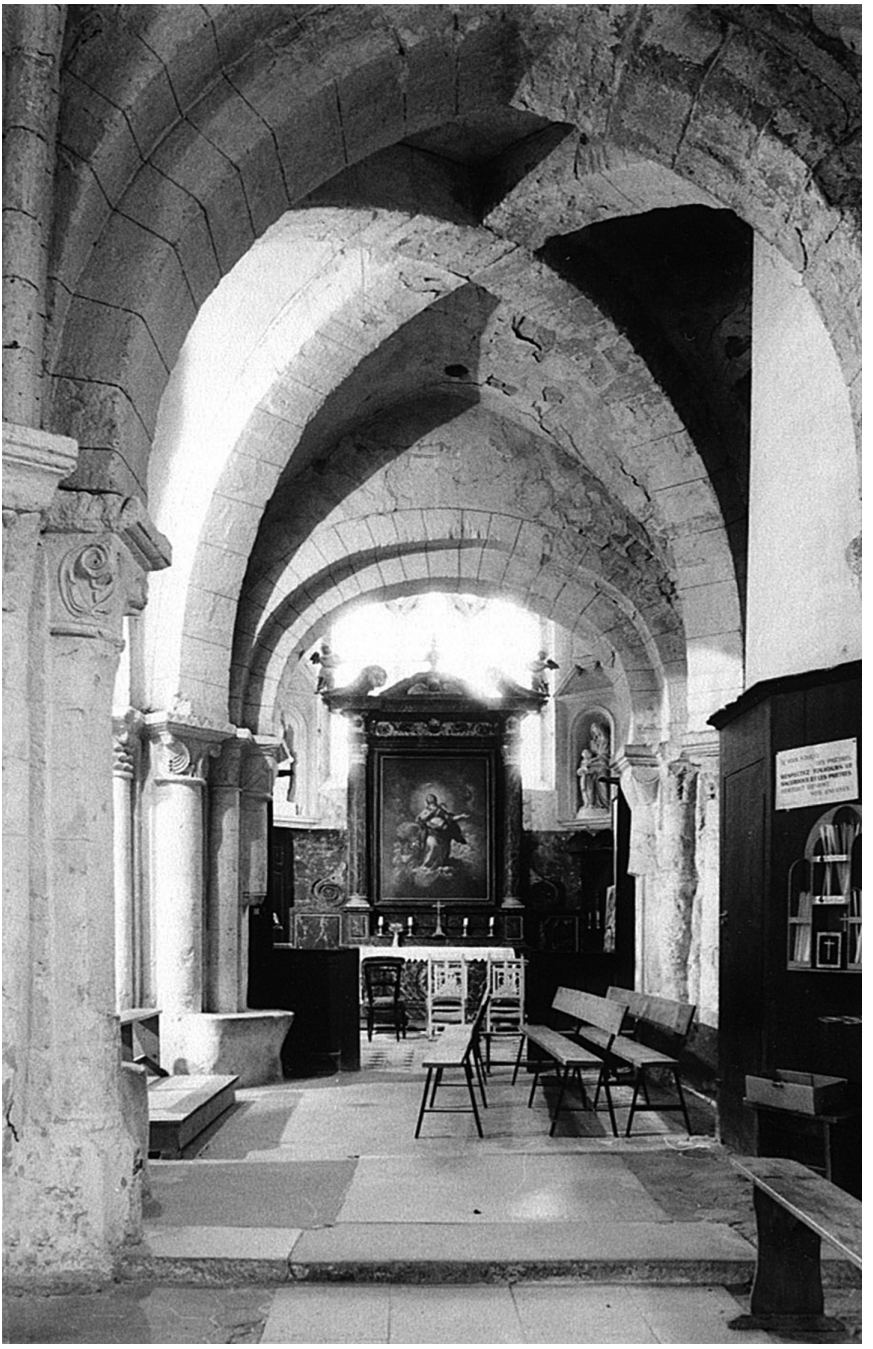

FIGURE 7.25 Acy-en-Multien, Saints-Pierre-Paul: tower base with rib vaults

Rib Vaults: There are only two documented dates precrusade: the high vaults in the Lessay choir, and the aisles at Durham. Neither would be considered the first.[115] To summarize, there may be 19 churches in the Paris Basin with ribs set over capitals that look earlier than 1094 (Figure 7.25).[116] They are mainly in the Oise and Aisne districts. The capitals indicate some may date from 1080±, and that most were contemporary with Lessay and Durham. Some can be identified from the peaked arch as well as profiles.[117] They seem earlier than anything in southern France or Italy.[118] These first ribs were not structural but used as cover strips that made the appearance of complex groin vaults neater.[119] It took more than two generations before the supportive value of ribs was appreciated. The first structural ribs were not until more than ten years after the crusaders returned, prompting the obvious suspicion that some masons learned this possibility from the east.[120] The functional potential of the rib took at least 25 years to become mainstream, and even then, some were still being built in a nonstructural manner 60 years later.[121]

Glazed Triforium: Builders experimented with this concept for 50 years before it caught on. Those in Couvrelles date from the later 1170s,[122] the little circular windows in Saint-Leu-d'Esserent from the mid-1180s, and the large circular openings in the Moret-sur-Loing apse from the 1190s—all experiments without progeny. Even after the exterior wall was fully glazed in Vaudoy-en-Brie in the mid-1210s (Figure 7.26), there were no copies until the 1130s when the entire external wall was finally eliminated and the triforium truly glazed.[123] Throughout this drawn-out process, the essence remained a passage shielded

115 Lessay is too large and Durham too sophisticated to be the first. Froidevaux, "Lessay"; Thurlby, "Lessay," 78; James, "Durham"; Aubert, "Ogives."

116 Acy-en-Multien, crossing; Crepy-en-Valois, Saint-Arnoul, crypt; Jouy-le-Moutier crossing; Parnes apse; Rhuis south chapel; Bonnesvalyn south; Oiry porch; Chartres, Saint-Pierre, south chapel; Courcelles-sur-Viosne tower base. For the second wave Marolles-en-Brie apse; Morienval chapels; Latilly crossing and the apses in Avrechy, Lesges, Conflans, Cauffry, Gaillon, Maule and Bailleval. For the capitals see James, *Ark of God*, 3:3 and 25–42. For Morienval (that I date to 1100±5) see James, *Ark of God*, 3:30–34 and especially "Rationale for dating" in Phase 12, https://www.creationofgothic.org/COGA/capitalphases.php?id=MORIENVA.

117 James, "Peaked Arch."

118 None before the earthquake of 1117, James, "Italy."

119 James, "Durham," 232.

120 James, "Peaked Arch," last page.

121 Bruyères-sur-Fère (1130s), Montigny-Lengrain apse (1150s), Acy south (1150s).

122 James, *Template-makers*, 58–61.

123 Dated from the capitals in the early 1210s; Branner, *Saint Louis*, 21–23.

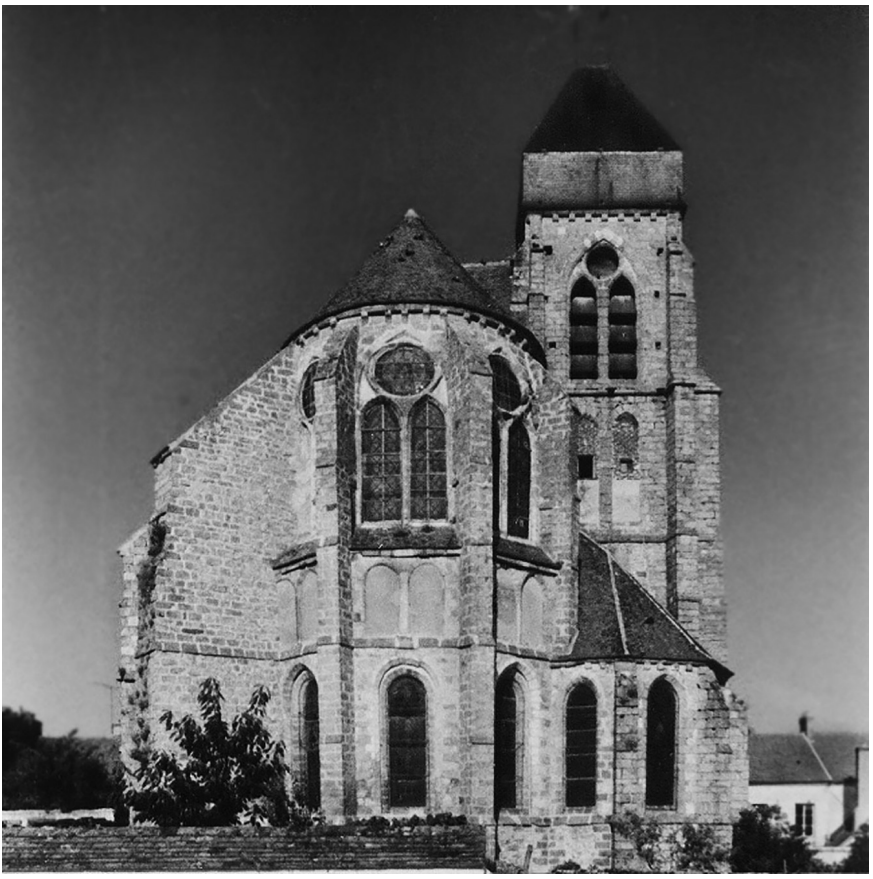

FIGURE 7.26 Vaudoy-en-Brie, Saint-Médard: from the east, triforium windows blocked

by columns. The genius was that over many jobs successive craftsmen transmuted the simple form of the Canon one small step at a time.

En délit Shafts: Compared to ashlar walls where the mortar in the joint compacts, the vertical bedding in *en délit* shafts does not shrink along the length.[124] This meant the masonry wall had to settle before the shaft could be installed.[125] The underside of the capitals over these shafts locates many of the joints between campaigns as the masons left for another job while the mortar joints settled. Even though it simplified cutting as the recess for the shaft could be simply squared off without the more difficult task of shaping round shafts

124 Olson, "Colonnette" and "Standardizing"; Gimpel, *Medieval Machine*.
125 Mark, *Experiments*, 70.

FIGURE 7.27 Noel-St-Martin, Saint-Martin: tower

on every course, the concept took some 50 years to be accepted. The earliest shafts were short, as in the windows of Rhuis and the nearby tower of Noël-Saint-Martin from the 1080s (Figure 7.27).[126]

7 Interlude 3: A Short History of Masonry

Though the history of the changing roles of master masons has yet to be written, the conditions described in documents from the 15th century cannot explain the 12th or the 13th. For hundreds of years after the decline of the Roman Empire there were few stone buildings north of the Alps and little monetary currency. A new industry emerged without tradition, and as the boom developed everyone was too busy to reorganize the system that evolved. An episodic method of working would have grown naturally out of the circumstances and as a result, the emerging building industry was utterly different to ours.

126 Dated from capitals, James, *Ark of God*, 3; https://www.creationofgothic.org/COGA/capitalphases.php.

As I wrote earlier, "Regional teams based on local quarries may have turned into loose organizations relying more on part-time subcontractors than on full-time labor."[127] Without schools of management or business theory, masters maintained their command over the treacheries of construction by keeping the teams small, just like domestic builders today. Through this period builders continued to travel seeking work, as they had at the beginning. As the amount of work increased a boom unfolded based on hotter days, prolific wine production, and widespread popular funding. Twice as many jobs were in progress in the decade after the crusade, and in the 1120s half as many again (Figure 7.1).[128] As the boom developed during the 12th century, construction transformed towns into immense building sites that occupied, directly or indirectly, an empire of workers.[129]

From the 1190s, the amount of building work decreased as the climate changed and rural enthusiasm gradually evaporated.[130] Compared to the 1180s, only half the outlay for church construction was being spent 40 years later;[131] and in the Paris Basin there were 474 projects in the 1160s compared to half that number in the 1230s. The reduction was particularly severe in the northeast bishoprics compared to the greater Paris area where royal conquests in Normandy and southern France maintained the industry well into the 1240s.[132] "Nearly all parish and local church construction had ceased by 1250, save for occasional small wings, a few added chapels, and such other work as required only modest and occasional funding."[133]

Robert Branner suggests that inventiveness and experiment, which in architecture is nearly "always a sign of confidence," began to dry up and "Reims itself began the retreat from innovation as early as 1225."[134] This is equivalent to writing that before 1230 the masons spread their ideas widely but that afterwards they settled down and creativity settled with them. By the middle of

127 James, "Chartres a eu de la chance," 41.

128 James, "How Many," 23–24; see *COGA-explore buildings-cost chart; and the map calculated from the COGA database, https://www.creationofgothic.org/COGA/map.php?srch_for=&page=map&srch_importance_1=1&srch_importance_2=2&srch_importance_3=3.

129 James, "Funding," 8–9 and 10–12.

130 James, "Boundaries," 28–32; Mann et al, "Temperatures"; Olofsson and Hickler, "Human Land-Use"; Ruddiman, "Overprints," 18–19; James, "Funding," 8–12.

131 James, "Funding," 1–2; Simson, *Gothic Cathedral*, 220.

132 Follow the ebb and flow decade by decade in *COGA-Explore buildings-Costs as heatmap.

133 James, "Funding," 11–12.

134 Branner, *Saint Louis*, 24–29.

the 13th century the Champagne fairs had greatly diminished,[135] the nobility was chronically in debt, municipal revenues "barely sufficed even for normal purposes,"[136] and a large proportion of independent husbandmen were being forced to sell and become rentiers. By the 1230s "the efflorescence of enthusiasm that had funded a great enterprise, and in the process created a new artistic idiom, was over."[137]

In the building industry everyone had been too occupied to restructure their methods until the boom finally burst. It would have been natural for the teams to reduce their numbers employed, but what of the most precious and skilled foremen and clerks, and what of the masters themselves? Did the contracting organizations down-size, or did the masters run for cover? The little evidence we have suggests the masters looked for tenure in a more permanent capacity at the great sites where some work might be expected to continue. The diffusion of Gothic into Burgundy, Germany, and elsewhere after 1230 may have been as much in search of work as a conscious choice by locals to use the foreign style.[138] By 1300 masters were being employed for life.[139]

By the end of the 13th century, the master is standing next to the king, sitting at high table and being well paid. Some masons mix in high society and the client often paid for his horse and an expensive cloak.[140] The growing use of drawings for design control may have affected status and pay for masters who supervised a number of jobs simultaneously. They are noted as being in charge, though they may be present for only a few days at a time.[141] In earlier times, masons like William of Sens were workmen who mixed with their men, climbed the scaffolding, and are not mentioned at the high table, while the named masters from later centuries, such as Henry Yevele and Peter Parler, kept their hands clean and may have had little influence on the templates across the large number of jobs attributed to them. Simply put, the roles changed from

135 Miller, *Economic History*, 132.

136 Miller, *Economic History*, 533; Kraus, *Gold*, 20–24.

137 James, *In Search*, 503–23. The Reims revolt is indicative of this decline, Abu-el-Haj, "The Urban Setting."

138 James, "Clermont-Ferrand," 5–7.

139 Colombier, *Les chantiers*, 61; Simson, *The Gothic Cathedral*, 220–23 n. 89–93; Shelby, "Design Techniques," 15–17; Turnbull, *Tricksters*, 79–82.

140 We should not dismiss the gift of a cloak as a small matter. At Troyes in 1334 Master Jacobus was presented with his annual gift of a fur-lined cloak that cost "63s. 6d.," about two month's pay for a mason: Murray, *Troyes*, 119; Salzman, *Buildings*, 46–48.

141 "As little as three to six days a year," Toker, "Remote control," 68–72 and 69 n. 6.

artisanal to professional/executive and opened the way for the rich dilettante as skill was replaced by expertise.[142]

8 Jobbing and Subcontracting

Though big numbers were needed on the great sites, large permanent crews may not have existed at this time. To recruit additional men the client could gather a number of small crews with their own masters or assemble a crew from whoever turned up. As English rolls tell us, masons were employed for short terms, and I have no reason to think this would not apply over the Channel. At Carnarvon the number of masons fluctuated from 63 in one week to 160 in the next and back to 64 a week later.[143] Employment was flexible, as when "a hundred extra hands may suddenly appear on the payroll, only to be discharged at the end of a few weeks."[144] These men were jobbers—"men who worked occasionally at separate short jobs"—rather than permanent employees or members of teams. "We have no hesitation in saying that the mediæval mason was essentially a wage-earner" who depended on how much work was available, on weather, and site uncertainties.[145] Masons and sculptors were unsecured part-time day workers who wandered or, if reputable, were sought.

The advantage for the man in charge was that independent subcontractors relieved him of the need to personally oversee everybody's work. He had only to instruct a gang foreman/master who then directed the others and produced the templates. In this way a number of crews would have been given responsibility for their own part of the building. "The Baumeister [had] no power to interfere with the [subcontractors'] control of his own craftsmen"[146] and "not all moldings were invariably designed by the master mason … [but] be delegated."[147]

At Senlis, the western bays of the cathedral were built by one team from plinths to clerestory while all to the east was constructed in horizontal

142 Turnbull, "*Ad hoc*," 330–33.
143 Salzman, *Building*, 35–36.
144 Salzman, *Building*, 61.
145 Knoop and Jones, *The Mediæval Mason*, 95.
146 Salzman, *Buildings*, 53.
147 Morris, "Mouldings," 30. See also, Olson, "Oh Master." Since profiles were extracted from what had already been built, and as the parts below the profile were earlier, we should not expect the same precise outline to be found in many places.

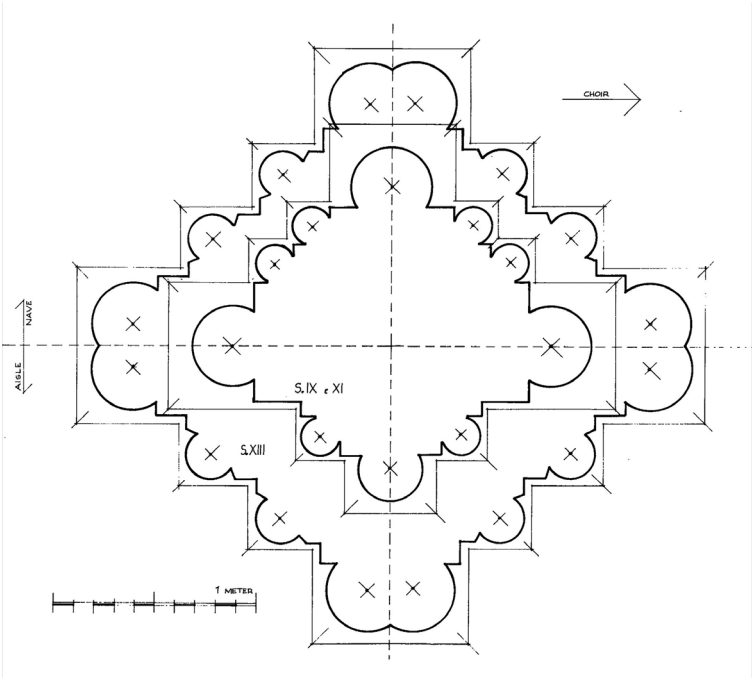

FIGURE 7.28 Senlis, Cathedral of Notre-Dame: comparison of west pier design and (within it) those in the rest of the building

campaigns.[148] The two parts were not built at different times, but in tandem, course by course. The western master used his own templates and the many working in the east used theirs (Figure 7.28), which makes it easy to see where they met. The *imagiers* working on the portal formed a third group that was integrated as needed.[149] Teams were assembled and masters employed in the same *ad hoc* manner as the men, though quarries may have offered more permanent employment.

The Courville nave could have been built by a team from the local quarry over many seasons.[150] There are four bays with aisles (Figure 7.29). The 34 courses from the floor to the top of the clerestory walls could have been built at

148 James, "Senlis."

149 Drawings or models could have transferred design concepts but not the details, as between Notre-Dame-en-Vaux and Saint-Remi, between Chars and Paris, and between Braine, Longpont, Soissons and Chartres.

150 Prache, "Courville."

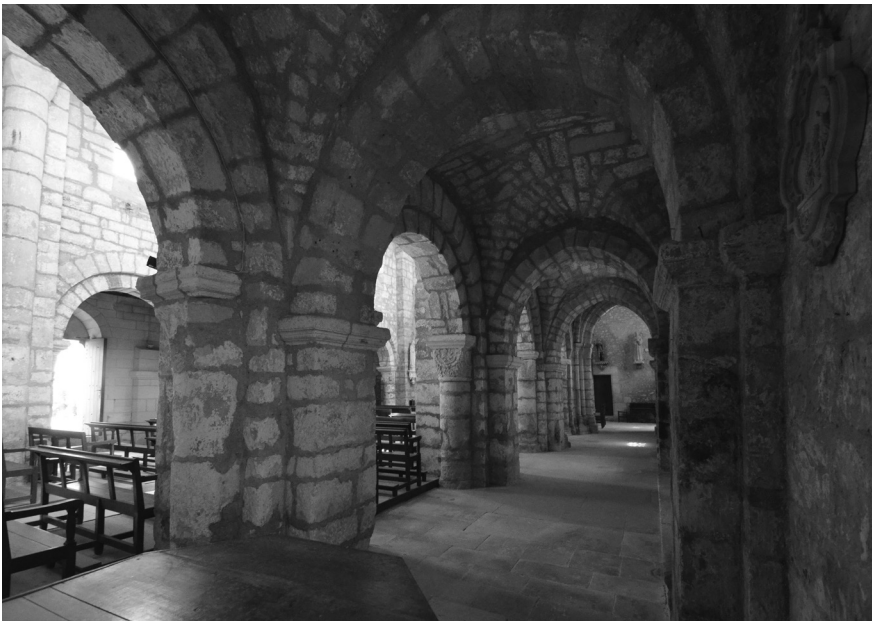

FIGURE 7.29 Courville, Saint-Julien: nave, south aisle

four or five courses a year. With about 300 stones per course eight men would have carved and placed them in six or eight weeks, leaving lots of time to work elsewhere in the same season.

In the Laon choir gallery, the number of *imagiers* fluctuated as the works progressed. The 221 remaining capitals may be allocated to 61 individuals, each staying an average of 31 working days or five to six weeks.[151] One third arrived solo, some as members of small gangs of two or three max, possibly with assistants and apprentices. Salzman reports: "They did not all arrive at the same time, nor did they leave together. They came when they could and seem to have departed as soon as they had completed their allotted task."[152]

It was similar with the 50 or so men assembled for the colonnettes at Chartres.[153] They "moved as individuals or small gangs rather than as large, organized teams."[154] The modern concept of workshops with settled craftsmen is misleading for this period. In every study in the *Master Carvers Series* the

151 James, "Laon gallery", pp. 4 and 21–22.
152 Salzman, *Building*, 34–36.
153 James, "Colonnettes"; Stoddard, *Chartres*.
154 James, "Laon Gallery," 5 and 22; James, "Cog Masters," 11.

FIGURE 7.30 Provins, Saint-Ayoul: Palmier capital from the west portal south door

evidence points to individuals in *ad hoc* engagements rather than permanent teams. Engagement was spasmodic: in the town of Chartres, masons on the cathedral site had the freedom to moonlight on personal tasks. There are many masonry doors and windows with corbels and decoration that look as if they were carved at the same time as the cathedral, though often derived from different units and geometry.[155]

Engagements, movement, roles, and working companionship all appear fluid, this being the best word to describe those times. The carver I called 'Palmier' traveled from Italy to Provins in the early 1130s (Figure 7.30), where he was joined by a companion who followed his palm-tree template but used the chisel in a different way.[156] Another companion with a tempestuous manner of carving joined him in Saint-Denis and Étampes. Just after the crusade,

155 From a study of the town doors and windows commissioned by the Société Archéologique d'Eure-et-Loir in 1972, deposited in their archive.

156 James, "Palmier," 34–37 and illustrated in *COGA-Explore carvers-The carvers-Palmier; Harvey, "Craftsman."

FIGURE 7.31 Vailly, Notre-Dame: Palmier capital from the north side of the apse

possibly by then in his mid-50s, he seems to have morphed into a master mason. There are seven buildings from the 1160s with a single simple palm-tree capital (Figure 7.31), none carved by Palmier. Could they have been his signature stone, reflecting the essence of his normal template? Was this how he showed he was the master? Did any other master leave signatures elsewhere? His life may have followed a common path of advancement as failing strength and eyesight propelled many from mason to master to executive. What we see in this evidence is the propensity to accomplish big jobs by assembling small subcontractors and a mobile workforce.

9 Executives

On large jobs the tasks were too manifold for one man to "visualize what was to be done, determine the method and also organize the teams so that his intentions would be carried out."[157] Large works required an executive team

157 Called "technoscience" by Turnbull, *Tricksters*, 69–71; James, *Contractors*, 542–43.

to coordinate the trades, schedule deliveries, authorize payments for men and materials and settle disputes, tend to the horses, order iron for nails and timber sheets for templates, set up enough kilns months in advance to burn the quicklime, and so on. Without future-oriented planning the works would have dissolved into chaos, for numberless logs for scaffolding cannot be produced overnight nor a hundred carts and their beasts assembled in a moment. "Organization was in no sense improvised (but) those responsible were well acquainted with the steps which should be taken."[158]

Most of the men mentioned in the labyrinths and the documents, Bernard de Soissons, Jean d'Orbais, and others, would have been executives, permanently employed and often called master. We know many of them today because they remained on site long after the tradesmen had moved elsewhere. It would seem there were two options, with the first more likely at the start of the works and the second as it progressed:

Option One: the executive teams were also the template-makers. They moved as a team, stayed for a season, or a part of it, and were the contractors I called Scarlet, Bronze, M1, etc. These teams were more sophisticated than the "domestic" builders and would have employed clerks as well as masons. In small works like Priez and Courville the master continued to carve while still performing the executive duties, as in most domestic work today. When the job grew and the work was too much for one man, assistants would be employed and an executive team was born, as we will see at Canterbury.

Option Two: the executive team was a professional and permanent entity separate to the contractors, while Scarlet, Bronze, etc. were subcontractors who contrived the templates. Their presence was seasonal.[159] The executive could have been run by an experienced master in a natural process of transition, like Palmier. Just as one gets older, one organizes more and creates less. At royal works like La Saint-Chapelle we would expect a single designer, yet the changes to profiles and elements show at least three subcontractors each of whom made their own templates.[160] Such great sites could have been run by a three- or four-man executive, and altogether there may have been a couple of dozen such teams active in the Paris Basin at the height of the boom.

Let us now explore how either of these may have worked at Chartres after the fire of 1194. Fifty years ago, I wrote, "… the cathedral of Chartres was not designed by three architects, or even five or six: in our sense of the word there

158 Knoop and Jones, *Mediæval Mason*, 45.

159 Possibility raised in Shelby, "Contractors," 173–76, and Henige, "Contractors."

160 James, *Template-makers*, 77.

were no architects at all, only building contractors" who worked for short periods, after which they would leave the site to find another project. "They were like the circuses of today which roam the country, settling on one site for their allotted time and then, complete with their tents and tools, departing for other places."[161] I was pilloried in no uncertain terms for this interpretation. Now, 50 years and over a hundred publications later, the on-site evidence shows that this is how the industry did operate during those years.[162] I erred in suggesting that the cause of multiple contracting was lack of funding, that site control was not essential, and to ignore the possibility of subcontractors.

9.1 *The First Plan of Chartres*

Immediately after the fire of 1194 and while the site was being cleared of debris, the clergy would have engaged experts for advice, as at Canterbury, Milan, and Troyes.[163] In the latter, Master Bluet, when asked about a projected façade, advised "look at Reims, Amiens and Notre-Dame in Paris, and base your work on those prototypes."[164] To get ideas the Chartrains may have visited, among other places, St-Michel-en-Thierace and Braine (Figure 7.32).[165] They settled on a cruciform plan and probably with a three-story elevation, and selected a master with the wit and skill to create the form, set out the geometry, and prepare a sketch or model to maintain uniformity, if only on the inside. The first project may not have been for the building we have today, but one closer to Braine or even Laon, if somewhat enlarged and adapted to suit what was already there.

With footings still below ground the master who designed the layout may not have returned to lay the above-ground plinths. Thus, none could ensure that the plinth master placed the first row of stones exactly where previewed by the footing master.[166] If the footing master had not prepared a model, all knowledge that they would have of his plans was the mass fill in the footings. Consequently, the initial scheme would be forever unknowable, and the first master himself equally unknowable.

Nevertheless, every project, great or small, must at some stage prepare a brief, no matter how minimal. For example, as Salzman illustrates, the

161 James, *Contractors*, 9–16 and 541–53.
162 Turnbull, *Tricksters*, 60–63.
163 Murray, "Bluet" and "Garnache."
164 Murray, *Amiens*, 82.
165 St-Michel was at the triforium level and Braine was almost finished, James, "Chartres Was the Outcome," 8–11 and James, *Ark of God*, 1:234–37.
166 See isometrics of early campaigns in James, *Contractors*, 180–91.

FIGURE 7.32 Braine, Saint-Yved: interior

instruction was limited to "Pull down and rebuild the chancel on the old foundations. The side walls are to be 17 feet in height; the east window to be of three lights; each side wall to have two two-light windows of similar design. There are to be angle buttresses, and one on each side wall."[167] No more would be needed. Drawings were not necessary as combining the tools of geometry with the Canon that sentence would have been enough to get most projects built in the Paris Basin. I have been a builder on dozens of projects, armed with ruler and tape, hammer and saw, and from practical experience I know I could have built a two-bay apse from those instructions.

From the above we should expect the client to use Option One, but afterwards? Was it possible that Chartres could have been built, with all its glory and reputation, by Option Two with a competent executive, subcontractors making site decisions, and a single instruction limited to "follow the model of the interior?" Let us examine the lithic evidence.

167 Salzman, *Building*, 437.

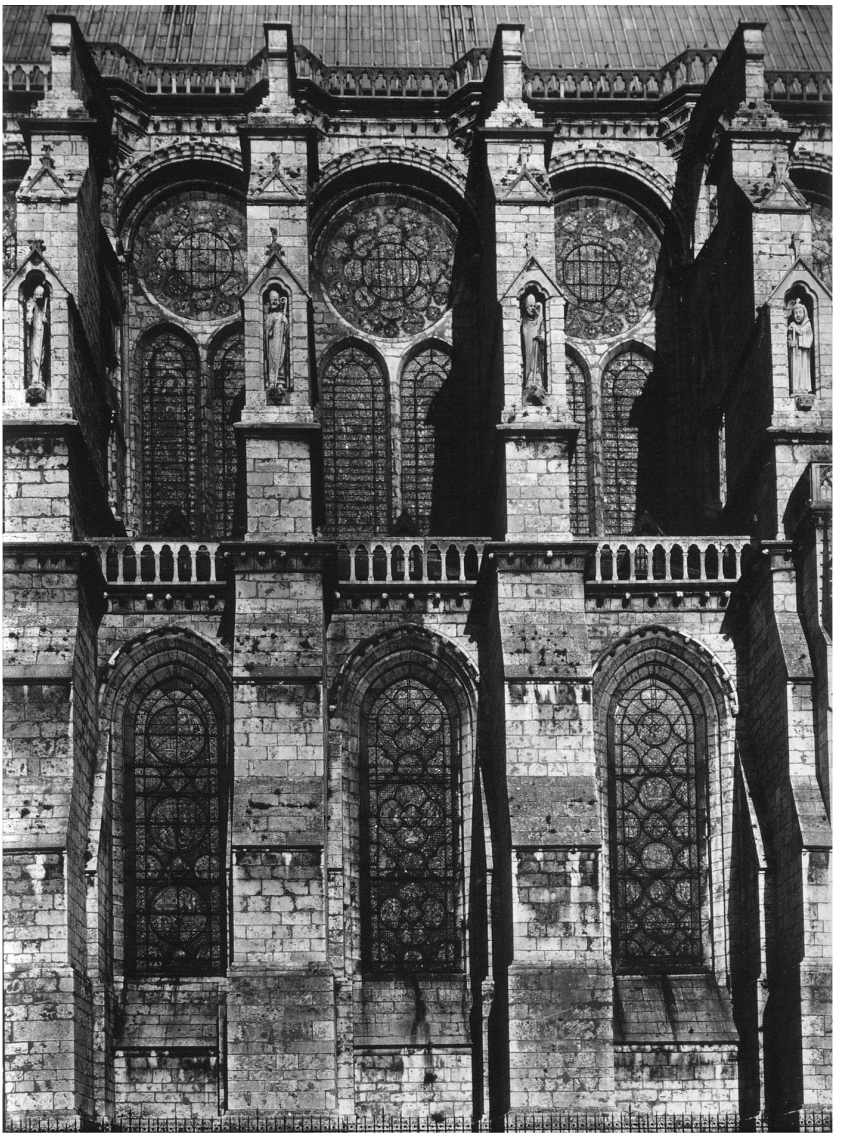

FIGURE 7.33 Chartres, Cathedral of Notre-Dame: nave from the south

9.2 *Later Campaigns*

During the first eight seasons change was relentless. As the site sloped away to the east the choir was many courses lower than the nave so there was time for later masters to change the sloping window sills of the nave into an external walkway in the choir. There is still a remnant of the nave sill in the sanctuary that shows they had intended to repeat the nave windows in the

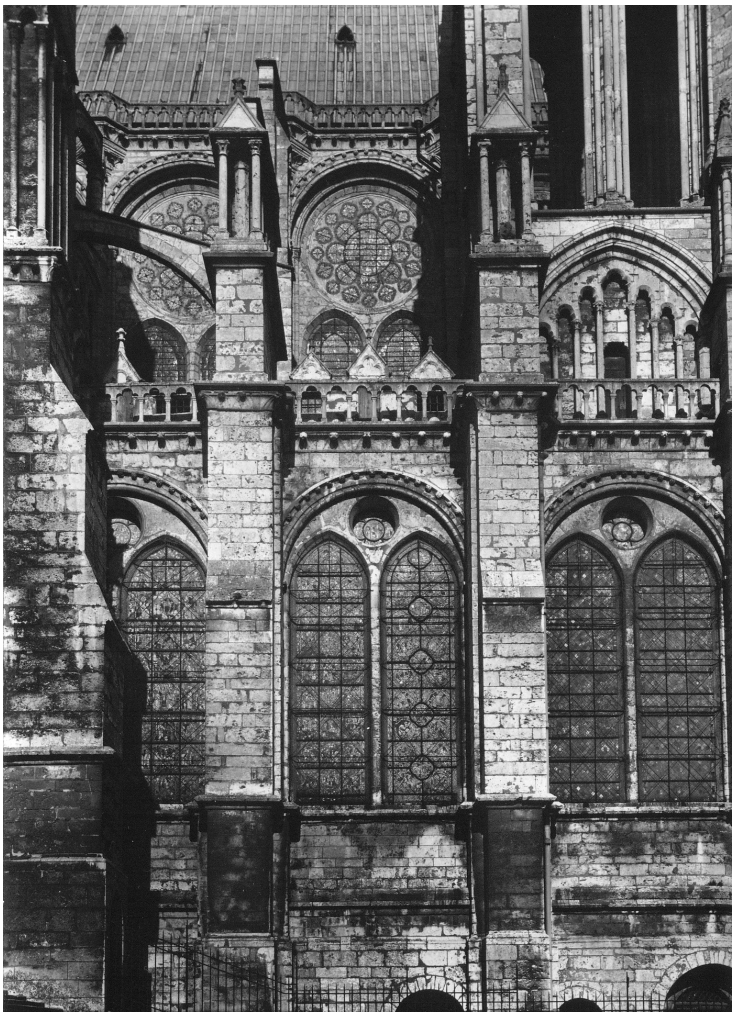

FIGURE 7.34 Chartres, Cathedral of Notre-Dame: choir from the south

east.[168] The change had momentous consequences (Figures 7.33 and 7.34). The choir with single windows and long sills would have produced a very different elevation. This was not all. In the course of the first six seasons the sanctuary buttresses were reduced in size, the single windows with pointed arches in the nave were doubled under round arches with plate tracery, and the crypt chapels were adjusted from curved to hexagonal. On the inside seven deep chapels

168 James, *Contractors*, 102–04.

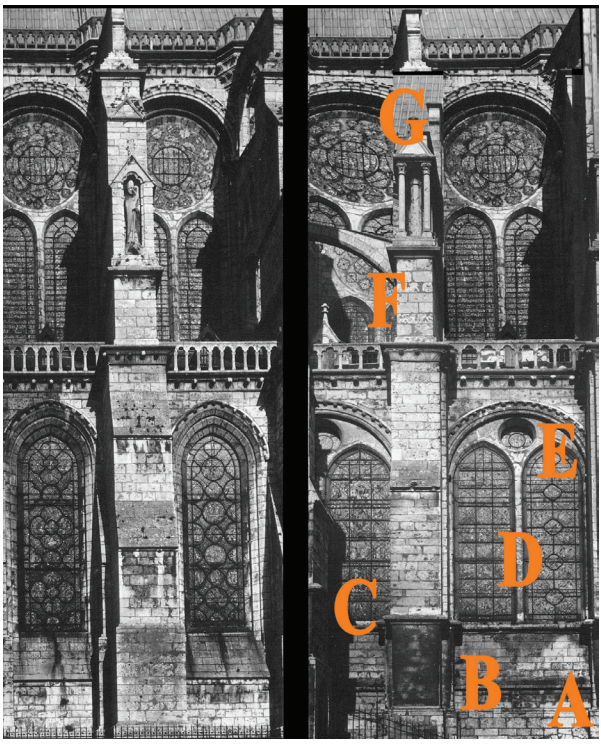

FIGURE 7.35 Chartres, Cathedral of Notre-Dame: comparison of nave and choir with major changes noted

were redesigned into a double ambulatory with shallow chapels, the crossing dimensions were changed four times and the bent axis was straightened and bent again.[169] As *the piliers cantonné* were not placed until the third campaign we cannot be sure they were part of the original plan: it may have been drum piers like at Braine.

Of eight decisions that seriously altered the Cathedral of Chartres only one affected the function; the rest lay within the purlieus of the masters (Figure 7.35). In theory, one master could have overseen all these changes, but what sort of man was he to condone their extent? The changes were the natural outcome of Option Two.

The original scheme may have followed the fashionable arrangement of the 1190s with tall single windows. Around 1210 someone visited Soissons where

169 James, *Contractors*: nave buttresses, 86–94; sanctuary buttresses, 144–47; single nave windows, 106–07; external walkway, 102–04; double east windows, 198–200; deep chapels, 166; double ambulatory, 170–75; exterior chapels from round to polygonal, 88–91; changes to axes, 155–59.

FIGURE 7.36 Chaillevois, Saint-Pierre: south rose

the twin-light clerestory windows and external walkway had been recently finished and proposed this more up-to-date scheme at Chartres.[170] The decision could have been made by laymen who needed only to encourage the Soissons master to come to Chartres in the next season. The evidence is that the profiles for the corbels, the sills and window frames, the walkway and the walk-through buttresses are the same in both buildings.[171] The concept for the "tall clerestory" may also have come from Soissons, a double inspiration.[172] The design for the head of the clerestory windows at Soissons was not copied at Chartres but replaced by huge plate-tracery oculi begun in campaign-X by Master Bronze. Most of his work was in the Laonnais and includes local churches with the same eight-sided giant rose (Figure 7.36).[173]

170 James, *Template-makers*, 134–36; Sandron, *Soissons*; Barnes, "Chartres and Soissons."

171 James, *Contractors*, 438–42.

172 Barnes, "Chartres and Soissons." The tas-de-charge had been in use since the 1120s, https://www.creationofgothic.org/COGA/list.php?srch_for=&page=&srch_department=&srch_features-VaultTasDeCharge=VaultTasDeCharge.

173 James, *Contractors*, 457–68.

One more item among many to note is the high vaults in the nave which are lower than the top of the western rose.[174] The height of the nave bosses was determined by the seating for the roof beams while the diameter of the rose established five years before required a vault over a meter higher. Two masters were involved in making their own independent decisions on height, with the result that the vaults between the nave and the rose were distorted to accommodate the difference.[175]

After the first campaign, all that follows looks consistent with Option Two.

9.3 *Canterbury*

Then what of Canterbury Cathedral? There is a misconception that construction at Canterbury after the fire was unusually quick, but in fact work continued at the Standard Maximum. No time was needed for footings as the thick walls of the Anselm choir were retained to at least the level of the new aisle vaults, and no time-consuming mortar-filled walls were required. The walls retained after the fire are tinted in Figure 7.37.[176] In the parts normally ascribed to William of Sens there are a host of discrepancies in shapes, alignments, arches, and piers, with at least six different plan arrangements for the imposts and significant differences in their profiles.[177] In the tribune arches there are misalignments between the plinths and the shafts they support; the aisle arches and ribs were adjusted where they did not coincide with the pier; the geometry behind the templates is inconsistent; the mullions differ across the gallery; piers change from octagonal to circular partway up; octagonal shafts sit on circular bases; bases were cut but not used, and if the transepts were built at the same time—well! Need one say more? Only details from the first season are moderately consistent suggesting that only at the start was William close to being in full control. This suggests Option 1. But thereafter the anomalies show that a number of crews were employed under William to bolster and/or replace the men he brought from France, and that they prepared their own templates with their own geometry for the parts they worked on. William had become the supervisor of other masters. He may have continued to make occasional templates, but in reality, he had joined the executive. The complexity of the tasks requiring his personal attention would have been taxed by difficulties of language once his French colleagues had left, and it would have been a pleasure to subcontract much of the work.

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174 James, *Contractors*, 457–60 and 547–52.

175 James, *Contractors*, 543–48.

176 James, *Ark of God*, 1:38–59.

177 From my unpublished notes from visits in the 1970s. Woodman refers to "alterations," to ideas "abandoned" or to "change of heart," *Canterbury*.

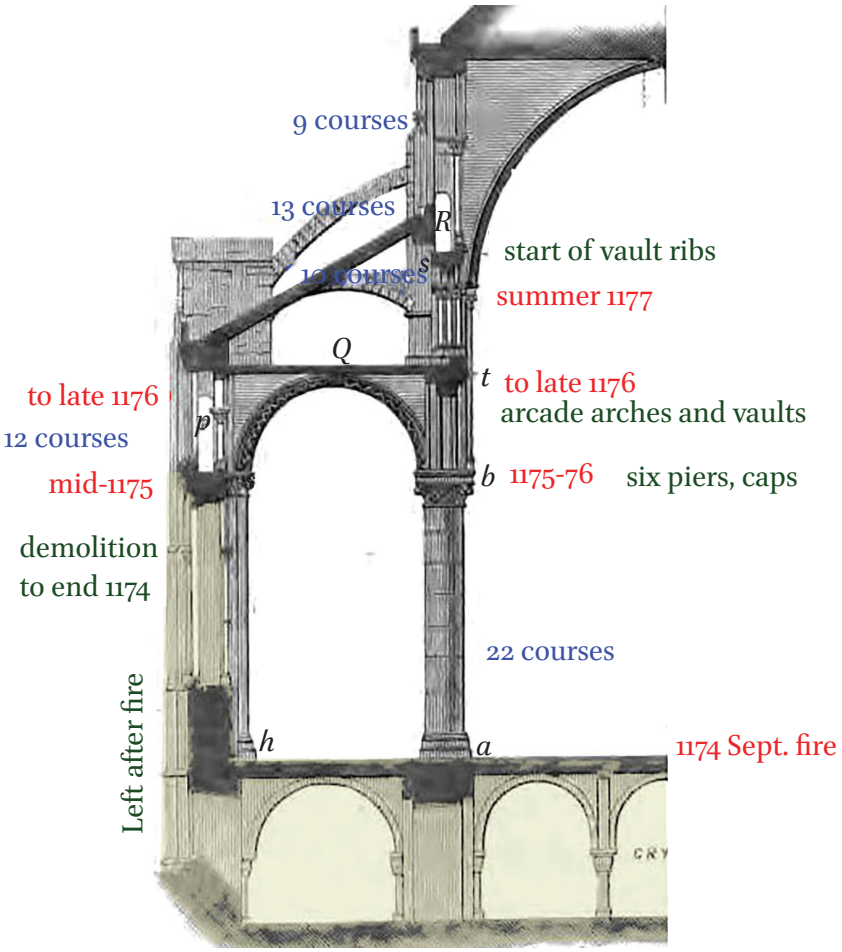

FIGURE 7.37 Canterbury, Cathedral: section with dates nominated in Gervase. Older stonework retained in foundations and walls shaded olive

Similarly, the capitals carved in the first campaign in the dado arcade and over the wall shafts look like others in the Paris Basin, as do some over the western piers.[178] However, after the second season, the majority are stylistically from other regions. It is significant that an unusual impost was used only in the first campaign, and in France is found only in those parts of the north gallery at Sens that may have been directed by William.

After the first season the work seems consistent with Option Two.

178 Illustrated in James, *Ark of God*, 1:38–59.

9.4 *Consequences 4*

Once the clergy at Chartres had a proposal, they had only to insist that "the interior follow the same arrangement throughout and do as you like with the outside" for the cathedral to display the elements for which it is famed. William's presence in Canterbury shows that one man could begin as creator and morph into master-executive as the workload became more compelling.

From everything discussed we must draw the following conclusions:

- fatty mortar meant that campaigns were small;
- the lack of measure meant that information could not be passed from one master to another and that change (both in detail and in essence) was inevitable;
- only geometry enabled masters to control the works;
- the Canon enormously simplified and unified the design process and
- in jobbing and subcontracting the detailed work could be parceled out to small groups with, on large jobs, an Executive to see to management.

Taken together they show that any building could have been constructed without a permanent master, and therefore the term architect is inappropriate. Thus, administrators managed larger jobs while leaving the masonry details to subcontractors.

In the boom years of the 12th century the cracks in their management systems were becoming apparent yet were resolvable with a flexible workforce and their geometric skills. The masters continued to develop their private geometry, continued to use their favorite profiles, and continued to employ the executive functions well-known to every contractor. Whichever occupied most of their time and energy probably depended more on circumstance than preference, just as today.

We have been deluding ourselves if we still believe in the faded idea of the lone genius in charge for years with a loyal body of masons, and likewise the unlikely proposition that any building could have been completed as designed.[179] Neither belief is necessary: their methods produced a more successful, organic, flexible, and creative architecture than any that had gone before. We should not write of permanent workshops or architects, nor should we assign whole buildings to named individuals with uncertain roles for the two hundred years the industry boomed and prospered and created Gothic architecture.

179 James, *Template-makers*, 1–7; Turnbull, "*Ad Hoc*."

10 Finding the Creators

At one time I had dreamt that "by identifying the major innovators of the period I would be able to bring a greater individuality to this most creative era. It would be thrilling to discover these men and to discern each step in their creative process, as in the invention of tracery. This opened a prospect that I found most exciting: to catch a glimpse, however brief, into the actual process of creation."[180] It is possible that my dogged gathering of profiles from a thousand churches may still be able to help identify the masons who boldly developed the Canon.[181] Though it seems impossible that we may ever identify the designers of whole buildings, we will be able to locate the more original subcontractors. Through this approach we may begin to clothe this period in the garb of real people performing real and exciting tasks, in which we become historians of process rather than fulfilment.

11 Gaudeumus Igitur

Gothic, in its most creative, was a contributory effort that offered individuals the sensational opportunity to create beyond their training in spite of knowing, or perhaps because of knowing, that the final appearance could not be predetermined. The masters assembled architecture through what we would consider limitations, yet it was precisely the originality of their methods that engendered the most endearing architecture of all times. It is like a forest where all the trees are assembled from the same parts, yet each trunk, each branch, and leaf is individualized. This may be why we so love the period, for its architecture evolved in an organic, empathetic way as each part was derived from what had come before.

This is exactly why discontinuous contracting was the appropriate process. With each fresh master came the possibility of change as a new imperious mind sought to personalize his contribution. Jean Bony understood this in his old age when he wrote "medieval architecture followed no predetermined course … it is only the irreversibility of what has happened that, after the fact,

180 James, "Chartres Was Lucky," 3–4.

181 I have suggested procedures to discover these men in James, *Template-makers*, chapter 7 "Decision-Making" (Soissons), chapter 8 "The Dossier Method" (M1), and chapter 9 "Whence Decisions" (Essômes).

turned accident into necessity."[182] Those confident years produced an extraordinary array of creations that emerged from a unique system of building that encouraged both discipline and diversity. Each work reflects the creative contributions of many men who knew continuity was not possible and multiple contracting was the most natural thing in the world. We could justly call it Contributive Architecture.

Acknowledgements

My deepest gratitude to the Australian Research Council who funded much of the Survey and the on-site photography. I thank many people, and especially Lon Shelby whose criticism instigated this investigation, my editor and friends Sarah Dillane, Chris Henige, Jethro Lyne, Paul Trouilloud, my mentor John Harvey and my essential and loving companion Hilary. I also thank those who attended the zoom conferences during the covid lockdown where we discussed these issues, Peggy Brown, Lindy Grant, Lindsay Cook, Paula Gerson, Jennifer Feltman, Grover Zinn, and Caroline Bruzelius.

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182 Bony, "Genesis," 20 and 29.

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CHAPTER 8

Hugues Libergier and His Instruments

Nancy Wu

The tomb slab of Hugues Libergier (d. 1263), who in 1231 began the construction of the Abbey Church of Saint-Nicaise in Reims, provides one of the best-known images of a medieval architect (Figure 8.1).[1] Originally located at Saint-Nicaise, which was demolished following the French Revolution, the stone slab was moved to the Cathedral of Reims in 1800 and, since 1887, has been mounted on the interior wall of the north transept west of the three portals.[2] As can be expected from the tomb slab memorializing an architect, Hugues is represented in the company of three instruments closely associated with his profession: a square, a compass, and a measuring rod,[3] all of which appear frequently on medieval sculptures, stained-glass windows, and manuscript pages.[4] While all three instruments have been analyzed, some even replicated, it is the square that has received the most attention.[5] This attention is in stark contrast

1 Maryse Bideault and Claudine Lautier, "Saint-Nicaise de Reims," *Bulletin monumental* 135 (1997): 295–330. Although the date 1229 is engraved on the tomb slab itself, the authors argue convincingly for a 1231 start date by citing a number of historical documents. See especially 296 and 328, n. 11 and 12 and also Charles Givelet, *L'Église et l'abbaye de St.-Nicaise* (Reims, 1897), 465–66. Hugues's tomb slab was classified in 1862 and has been restored recently in 2009. See http://pop.culture/gouv.fr/notice/palissy/P<51001269 (accessed 5 December 2021) and Jean-Luc Collignon, "Pavés Snobés," https://jeanluccollignon.blog4ever.com/paves-snobes. Accessed 1 December 2021.

2 Henri Jadart, "Les inscriptions lapidaires de Notre-Dame de Reims," *Travaux de l'Academie nationale de Reims* 118 (1904–05), 17. For the tomb slab's successive locations within the cathedral, see Charles Cerf, *Histoire et description de Notre-Dame de Reims* (Reims, 1861), 2:385–86; and Louis Demaison, *La Cathédrale de Reims* (Paris, 1913), 118.

3 The canonic text on this subject remains Lon Shelby, "Medieval Masons' Tools. II. Compass and Square," *Technology and Culture* 6, no. 2 (1965): 236–48. For more recent discussions see Anthony Gerbino and Stephen Johnston, *Compass and Rule* (New Haven, 2009), 17–30; and Francesco Abbate, "The Planning and Building Instruments of Architects in the Late Middle Ages," in *Proceedings of the Second International Congress on Construction History*, ed. M. Dunkeld (Cambridge, 2006), 2:111–25.

4 For images of medieval architects and their tools, see, Pierre du Colombier, *Les Chantiers de Cathédrales* (Paris, 1973); Roland Recht, ed., *Les Bâtisseurs des cathédrales gothiques* (Strasbourg, 1989); Nicola Coldstream, *Masons and Sculptors* (London, 1991); and Alain Erlande-Brandenburg, *Cathedrals and Castles* (London, 1995).

5 du Colombier, "Le Compas du maître d'oeuvre," *Bulletin de la Société nationale des antiquaries de France* (1967), 17–26; Alain Sené, "Un instrument de précision au service des

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with the relatively scant interest given to the miniature building cradled in Hugues's right hand, universally identified as a model of Saint-Nicaise.[6] Given the drastically different scales used for the model and the instruments, the disparity of scrutiny is understandable: the model church (the term itself already implies the diminutive size) is unmistakably symbolic, while the nearly life-size instruments tantalizingly realistic. Little wonder the persistent inclination to regard the instruments verbatim reproductions of actual tools, as does John James, who considers the engraved tools "probably precisely those used by Libergier himself."[7] Bernard G. Morgan concurs that "the size of the 'Libergier' square … suggests … a full-scale representation of a 13th-century instrument." He further postulates that "the artist responsible for the design of the tomb simply traced the outline of a master mason's square, possibly Hugh Libergier's own instrument—on the surface of the slab."[8] Others not only replicate the square but also apply the instrument to account for dimensions found at disparate sites. For example, Joaquín Lloveras Montserrat in 2012 derives different measuring units from Hugues's square, and reportedly finds their application on the tomb slab itself, on the surviving pavement blocks from Saint-Nicaise (now installed at Reims Cathedral), and at monuments from Chartres to Moissac.[9] By reviewing a few studies specifically addressing Hugues's square from the past few decades, this paper considers various issues attending such interpretations and the validity of this line of inquiry, arguing instead that the engraved tools, as are most instruments appearing on tomb slabs or sculptures elsewhere, no more than emblematic attributes meant to proclaim

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artistes du Moyen Age: l'équerre," *Cahiers de civilization médiévale* 13 (1970): 349–58; idem, "Quelques instruments des architects et des tailleurs de pierre au Moyen Age: hypothèses sur leur utilisation," *Actes des Congrès de la Société des historiens médiévales de l'enseignement supérieur public* 3 (1972): 39–52; and John James, "The Tools of Hues Libergier. Master Mason of the Thirteenth Century," *Architectural Theory Review* 2/1 (1997): 142–49. Libergier's compass has been reproduced in wood by Andrea Vitussi in a video, "Prototipo del Compasso Serpentiforme di Hugues Libergier," https://www.youtube.com/watch?v=jLErzWUpdHI. Accessed 16 November 2021.

6 For a recent and rare detailed description of the model, see Emanuel Klinkenberg, *Compressed Meanings: The Donor's Model in Medieval Art to around 1300* (Turnhout, 2009), 217–18. Also, Cerf, *Histoire et Description*, 2:385; Coldstream, *Masons & Sculptors*, 15; Erlande-Brandenburg, *Cathedrals and Castles*, 37; and Paul Binski, *Medieval Death, Ritual and Representation* (Ithaca, 1996), 90.

7 James, "The Tools of Hues Libergier," 143.

8 Bernard G. Morgan, *Canonic Design in English Medieval Architecture* (Liverpool, 1961), 61. Hereafter cited as Morgan.

9 J. Lloveras Montserrat, *Hugues Libergier and the Square NT* (2012). http://hdl.handle.net/2117/16535. Accessed 15 November 2021.

FIGURE 8.1 Tomb slab of Hugues Libergier, Reims Cathedral
PHOTO: GUGLIELMO VILLA

the profession, thereby highlighting the status and authority, of this rémois architect.

The square has been documented as far back as the ancient world.[10] The various functions it served in the medieval building trade can be glimpsed from contemporary diagrams demonstrating its practical usage. The best known are the squares appearing in the drawings of Villard de Honnecourt (folios 20r and 20v), showing how the tool was used for cutting vault springers and voussoir blocks, for constructing two concentric vessels whose radii measure 1: √2, and for determining the diameter of a column.[11] The square appears frequently in images depicting construction sites, attesting to its prevalent use throughout the Middle Ages.[12] There are two major types of squares, each with its own variants: with straight arms, or tapering arms. The length of the arms varies, as does the angle the arms enclose. The square depicted on Hugues's slab is constructed with tapering arms (Figure 8.2), the function of which remains less understood and is subject to considerable discussion. In 1986 Marie-Thérèse Sarrade described a tapering-arm square traced from a 12th-century tomb slab at Ligné-des-Bois in Charente.[13] Both the inner and outer edges of the arms enclose a 90° angle. However, the edges are not parallel but diverge from each other by 2.5cm, so the arms taper.[14] By placing the square's internal side along one side of a 2:3 rectangle where the external side of the square's divergent arm touches the rectangle's far corner, the desired length of √2 is expediently located.[15] The instrument also allows for the unfurling of a series of squares

10 John Murdoch, *Album of Science, Antiquity and the* Middle *Ages* (New York, 1984); Henri Michel, *Scientific Instruments in Art and History* (New York, 1996); and Henry Dickinson, "A Brief History of Draughtsmen's Instruments," *Transactions of the Newcomen Society* 27 (1949–50), 73–84.

11 Carl F. Barnes, Jr., *The Portfolio of Villard de Honnecourt* (Farnham, 2009), 130–45. See also Shelby, "Medieval Masons' Tools," 244–48; idem, "Setting out the Keystones of Pointed Arches: A Note on Medieval 'Baugeometrie,'" *Technology and Culture* 10 (1969): 537–48; Claude Lalbat, Gilbert Margueritte, and Jean Martin, "De la stéréotomie médiévale: la coupe des pierres chez Villard de Honnecourt," *Bulletin monumental* 145 (1987): 387–406; and Roland Bechmann, *Villard de Honnecourt, la pensée technique au XIII^e siècle et sa communication* (Paris, 1991), chapter VI, "Construction et stéréotomie," 169–230.

12 See examples in du Colombier, Recht, Coldstream, and Erlande-Brandenburg. See also Müller, "Le dessin technique à l'époque gothique," in Recht, *Les Bâtisseurs*, 236–54 (hereafter cited as Müller).

13 Marie-Thérèse Sarrade, *Sur les Connaissances mathématiques des Bâtisseurs de Cathédrales* (Paris, 1986), 48–52 (hereafter cited as Sarrade). Tracing of the Charente square is also reproduced in Müller, 236.

14 The arms diverge consequently at a variance of between 445' and 446'. Sarrade, 48. See also, Müller, 240 and Bechmann, *Villard de Honnecourt*, 193, n. 22.

15 Sarrade, 48; Müller, 236.

in a dynamic manner, where the side of one square equals the diagonal of the next (smaller) square. This method gives rise to a linear extrapolation of the ratio 1: √2 which, while yielding the same result, is quite unlike the concentric construction of rotating-squares famously demonstrated by Roriczer three centuries later.[16] The square root of two (√2) is an irrational number very much understood in the ancient and medieval world.[17] Its presence is found in designs on varying scales, from actual medieval structures,[18] to monumental stone crosses, and manuscript pages.[19] It was also referenced in such medieval sources as letters and treatises.[20] Expressed by the length of the side of a square (1) to that of its diagonal (√2), the ease with which this ratio can be obtained geometrically and proportionally (2:3, 5:7, 12:17, etc.), rather than arithmetically (1.414…), explains how and why it was preferred by medieval masons.[21] Proportionally "customized" squares, therefore, would have been a practical solution to expedite many of the mason's tasks with elegant simplicity.

The idea that a square (as a tool) could indicate two different triangles (geometric shape enclosed by the square) is not new. B.G. Morgan examines almost 30 English buildings from the 13th- through the 16th-century, significantly three with royal connections (King's College Chapel in Cambridge, Henry VII's Chapel in Westminster, and St George's Chapel in Windsor) that

16 Sarrade, 48–51; Müller, 236–39. For Roriczer's *Büchlein* see Shelby, *Gothic Design Techniques: The Fifteenth-Century Design Booklets of Mathes Roriczer and Hanns Schmuttermayer* (Carbondale, 1977), 81–106; Nancy Wu, "Roriczer, Schmuttermayer, and Two Late Gothic Portals at The Cloisters," in *Arts of the Medieval Cathedrals: Studies on Architecture, Stained Glass and Sculpture in Honor of Anne Prache*, ed. Kathleen Nolan and Dany Sandron (Burlington, 2015), 71–90; and Peter Kidson, "Roriczer's Iceberg," *Journal of the Warburg and Courtauld Institutes* 71 (2008), 1–20.

17 Kidson's "A Metrological Investigation," *Journal of* the *Warburg and Courtauld Institutes* 53 (1990): 71–97 gives an insightful examination on the historical applications of this ratio. For a brief overview, see Malcolm Heslop, *Medieval Masons* (Botley, 2009), 18–19. For the earliest documented approximation of √2 on the important Babylonian clay tablet at Yale University, see David Fowler and Eleanor Robson, "Square Root Approximations in Old Babylonian Mathematics: YBC 7289 in Context," *Historia Mathematica* 25 (1998), 368.

18 The literature is vast on this topic. See a collection of papers in Wu, ed., *Ad Quadratrum: The Practical Application of Geometry in Medieval Architecture* (Aldershot, 2002).

19 Robert Stevick, "Shapes of Early Sculptured Crosses of Ireland," *Gesta* 38, no. 1 (1999): 3–21.

20 One of the oft-mentioned treatises, *Pratike de Geometrie*, is at the Bibliothèque Sainte-Geneviève in Paris: Recht, *Les Bâtisseurs*, 238–39 and Bechmann, *Villard de Honnecourt*, 193, n. 22. An early 11th-century letter between "two one-time pupils of Fulbert of Chartres" discussed the relative merits of 7/5 and 17/12—proportions approximating √2. Kidson, "A Metrological Investigation," 77; see also n. 21 below.

21 Kidson, "A Metrological Investigation," 77. Arithmetically, 7/5 =1.4; 17/12 = 1.416, and √2= 1.414.

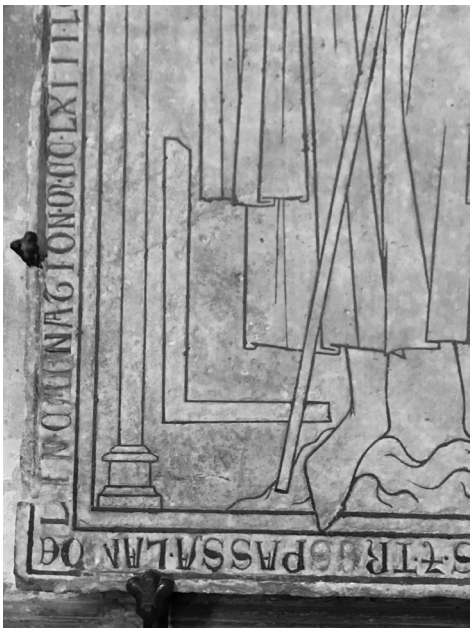

FIGURE 8.2
Tomb slab of Hugues Libergier, detail showing square
PHOTO: AUTHOR

were "conceived during a period in which … crown-inspired legislation was directed towards the standardization of linear measurement and the establishment of units of length …"[22] Among them, Morgan observes a number of seemingly random measurements that, in fact, might be related to certain triangles.[23] For example, a measurement obtained from King's College, when considered the side of a triangle with its internal angles adjusted, gives rise to measurements of other structures (Henry VII's Chapel, Canterbury Cathedral). The design of tapering-arm squares, suggests Morgan, involves the simultaneous presence of both triangles: the "general triangle" containing the angles 30°, 60°, 90°, and the "canonical triangle" (alluding to its royal association) which encloses the angles 31° 43', 58° 17', and 90°.[24] It is in Hugues's square where Morgan finds physical proof of the two merged in the design of one tool: the external edges of Hugues's square enclose the "general triangle" (30°, 60°, 90°) while the internal edges enclose the three angles of 31°30'10", 58°29'50", and 90°, approximating the so-called "canonic triangle" (Figure 8.3).[25] Morgan

22 Morgan, 47.
23 Morgan is convinced that these seemingly disparate dimensions were not only related but also arrived at geometrically. Morgan, 48 and 51, figs. 4–5.
24 Morgan, 55.
25 Morgan, 58, figs. 8 and 61.

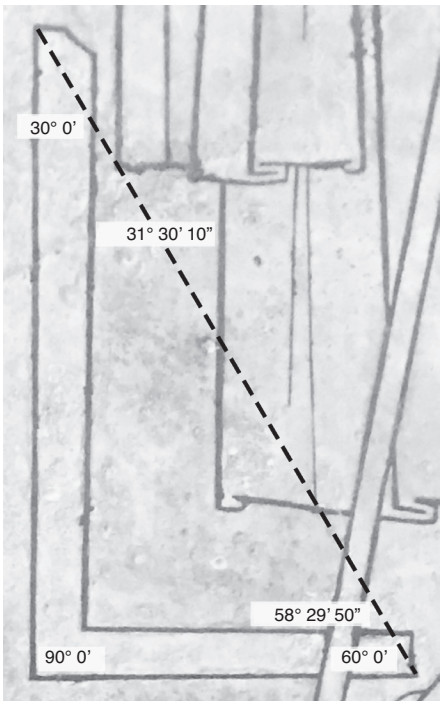

FIGURE 8.3
Hugues Libergier's square (author) overlaid with measurements from B.G. Morgan, *Canonic Design in English Medieval Architecture* (Liverpool, 1961), 56

not only considers the form of this square evidence of a historical practice, as mentioned previously he further suggests that Hugues's engraved square represents a historical object.[26] Morgan's study also touches on the status of the instrument. Not merely a utilitarian tool, the square is a symbol of authority, an instrument that "… together with a robe … often distinguishes the master mason from other workmen of more lowly rank."[27] The square on Hugues's tomb slab permits Morgan to explain how a tool involving more than one set of angles can help achieve multiple measuring units. While suggesting possible correlations between dimensions found at Westminster Abbey, St. Stephen's Chapel, and that of a contemporary "French system of linear measurement," Morgan never fully explains how a square appearing on the tomb

26 See n. 8 above. He remarks that "the carver of the tomb could hardly have anticipated that this ancillary symbol would become the subject of critical interest seven hundred years after his death." Morgan, 61. For his analysis James measures all three instruments on the slab from both the inner and outer edges of the lead-filled outlines, concluding that only "the outer edge of the lead coincided with the original outline of the tools." James, "The Tools of Hues Libergier," 142–43.

27 Morgan, 48.

of a 13th-century French master mason came to be associated with buildings constructed under English royal patronage across the Channel.[28]

By examining a small group of 13th- and 14th-century squares either represented in manuscripts or carved in stone or wood, Léonard Legendre and Jean-Michel Veillerot in 1982 also set out to seek connections between specific instruments and the design of actual buildings. Hugues's square, they propose, encloses an internal triangle of 30°, 60°, 90° and an external, golden triangle ("triangle d'or") of 90°, 58°29'50", 31°30'10." This so-called golden triangle of course corresponds to Morgan's "canonic triangle" (90°, 58°17', and 31°43').[29] Furthermore, two squares from the album of Villard de Honnecourt, the authors suggest, enclose with their internal edges the "decagonal square" of 90°, 54°, and 36° (so named after the fact that individual segments of an evenly divided decagon each encloses a 36°angle) and with their external edges the "golden square" of 90°, 58°20' and 31°40' (which yields the Golden Section of 1.618).[30] By manipulating both of the Villard squares—not the Libergier square—Legendre and Veillerot identify two proportional systems responsible for the design of the ground plan of Reims Cathedral.[31] They unfold the design sequence in 22 steps, progressing dynamically from west to east, beginning with the overall envelope established with two decagonal rectangles, followed by the west façade block which is defined by two golden rectangles.[32] Although the authors are responsibly cautious in declaring their exercise speculative, they do not explain how these squares from an album created well after the start of the cathedral's construction could have been used for its design. Further, their proposed ground plan originates from the west, which contradicts what has been accepted to be the directional progression of the cathedral's construction. Recent findings in archaeology, dendrochronology, and even astronomy have confirmed that construction started east of the transept,

28 Morgan, 53–54.

29 Their discussion of Hugues's square derives considerable information from Morgan. Léonard Legendre and Jean-Michel Veillerot, "L'architecte, l'équerre et la géometrie instrumentale au Moyen Age: Analyse du plan de la cathédrale de Reims," *Médievales* 1 (1982): 64–65, hereafter cited as Legendre and Veillerot.

30 The authors' readings of the two "Villard squares," so-called "Equerre 1" and "Equerre 3" yield very similar measurements. They are, respectively, an internal decagonal triangle of 36°, 53°45', 90° (square 1) or 36°, 54°, 90° (square 3); and an external golden triangle measuring 31°30', 58°30", 90° (square 1) or 31°40', 58°20", 90° (square 2). Legendre and Veillerot, 68–69.

31 "Les équerres 1 et 3 de Villard de Honnecourt nous paraissent les plus remarquables car **1 seul instrument donne les deux systèmes de proportion trouvées à Reims** …" (bold by authors). Legendre and Veillerot, 71.

32 Legendre and Veillerot, 73–76.

continuing eastward to complete the chevet before moving westward onto the nave. Crucially, archaeological remains and documentary evidence inform us of the original west façade to be two full bays east of the current location.[33] It is therefore problematic to include the current west façade as part of the initial generating "envelope." Most importantly, the proposed sequence does not reflect key design elements observed at Reims. For example, the underpinning geometry of the hemicycle derives not only from a decagon (as the authors propose) but also from a circle: four of the six hemicycle piers stand exactly on the circumference of a theoretical circle.[34] Moreover, these hemicycle piers enclose not a perfect half-circle but an area larger than 184°, as Robert Branner already observed in 1961.[35] Nor is the intercolumniation of these piers equidistant.[36] The catalyst for these aberrations remains unknown—an error during the staking process, or a desire to create a wider axial bay, are but two of the possibilities. Legendre and Veillerot's reliance on solely the decagonal and golden triangles to account for the area encompassing the choir straight bays and the transept is also questionable. Again, the building's dimensions suggest instead the use of two intersecting √2 rectangles, identical in dimensions: one defining the choir straight bays and the other, the three-aisle transept. This would have been a much simpler, and elegant, solution to make coherent such

33 For recent research on the chronology of Reims Cathedral, see A. Prache, "New Dendrochronological and Archaeological Evidence for the Building Chronology of Reims Cathedral," in *Archaeology in Architecture: Studies in Honor of Cecil L. Striker*, ed. J. Emerick and D. Deliyannis (Mainz, 2005), 167–72; Walter Berry, "The Thirteenth-Century Foundations of Notre-Dame de Reims: New Evidence for the Construction History of the Cathedral," in *Arts of the Cathedrals: Studies on Architecture, Stained Glass and Sculpture in Honor of Anne Prache*, ed. Kathleen Nolan & Dany Sandron (Farnham, 2015), 7–25; and Alain Villes, *La Cathédrale Notre-Dame de Reims* (Joué-lès-Tours, 2009) especially "Les travaux de la façade occidentale," 417–504. Also essential is Peter Kurmann's *La façade de la cathédrale de Reims* (Paris, 1987).

34 Wu, "Le chevet de la cathédrale de Reims et le plan du début du XIII^{e} siècle," in *Nouveaux regards sur la cathédrale de Reims*, ed. Bruno DeCrock and Patrick Demouy (Langres, 2008), 76, fig. 10. For fresh measurements taken recently by Robert Bork and his ongoing analyses of Reims, see https://geometriesofcreation.lib.uiowa.edu/. Accessed 1 December 2021.

35 The angles of the five radiating bays are, from north to south: 36.215°, 37.770°, 38.698°, 37.628°, and 38.090°, well over 186° (my own measurements). See also Robert Branner, "Jean d'Orbais and the Cathedral of Reims," *Art Bulletin* 43 (1961): 131–33. The earliest observation of Reims's not-quite perfect hemicycle is Lamy, who measured the area east of the crossing in order to correct the overly schematic plan of Reims published in Viollet-le-Duc's *Dictionnaire*, 2:316. See Edouard Lamy, "Études à Notre-Dame de Reims," *Travaux de l'Academie nationale de Reims* 84 (1890): especially 376.

36 The measurements of these bay openings are, from north to south: 4.622 m, 4.793 m, 4.906 m, 4.776 m, and 4.851 m. Wu, "Le chevet de la cathédrale de Reims," 76, fig. 9.

an immense space.[37] In short, the authors' proposed duo system for the design of the Reims ground plan remains tentative at best.

This brief review of select studies demonstrates how much serious consideration has been given to the square on the tomb slab of Hugues Libergier. Fascinated by the instruments, I too have attempted to find correlations between markings on Hugues's measuring rod and certain measurements obtained from Reims Cathedral (Figure 8.1).[38] For example, the overall length of the rod, measuring approximately 158 cm, is almost identical to the diameter of the six hemicycle piers of 157.5 cm.[39] As a practical matter, it seems logical to determine any given length—in this case, the diameter of the hemicycle pier—with whole-number units. Thus, if we consider the diameter of 157.5 cm a five-foot module, with each foot measuring 31.5 cm, we arrive at a foot unit documented in premetric France, in the Département de la Marne in which Reims is located.[40] I also use this 31.5 cm foot to analyze the width of the south choir aisle of 7.98 m which, when compared with the width of the center aisle of 14.78 m, yields a rather untidy ratio of 1:1.85.[41] What if, I ask, the south aisle was staked out as a 25-foot distance (with a foot unit of 31.5 cm), meant to be half the width of the center aisle of 50 feet (with a shorter, quasi-Roman foot of 29.5 cm known in medieval France)?[42] The mixed use of

37 Wu, *op.cit.* 67–79. For a recent analysis of the Reims chevet and transept, see Bork, "Changing Geometries in the North Transept of Reims Cathedral," in *The North Transept of Reims Cathedral: Design, Construction, and Visual Programs*, ed. Jennifer Feltman (Abingdon, 2016), 65–83.

38 While most people consider the rod a practical tool, Woodman regards it a "staff of office"—a symbol of authority. Francis Woodman, "For Their Monuments, Look about you: Medieval Masons and Their Tombs," in *Architecture and Interpretation: Essays for Eric Fernie*, ed. Jill A. Franklin, T.A. Heslop, and Christine Stevenson (Woodbridge, 2012), 178–79.

39 Some of the measurements were taken with the assistance of Walter Berry and Marie-Thérèse Zenner, to whom I am grateful. There are four dividing lines engraved on the rod, separated by 10.5 to 11 cm. The total length from the top to the fourth dividing line measures 32 cm.

40 The recorded foot unit, comprising 11 ½ pouces, measures 31.58 cm. Jean Poterlet, *Tables de comparaison entre les mésures anciennes usitées dans le Département de la Marne, et celles qui les remplacent dans le nouveau système mètrique* (Chaalons, 1803), 3–4.

41 Both the south choir and center aisle widths fluctuate; these are mean dimensions of each.

42 For the south choir aisle: 7.98 m/0.315 m = 25.3, approximating a 25-foot distance. For the center aisle, 14.78m/0.295 m = 50.1, or about 50 feet. The latter is close to a Roman foot which existed in parts of medieval France especially Alsace and Picardy, known variably as *pied de pays*, *pied du Vermandois*, or *pied marchand*. Ronald Zupko, *French Weights and Measures before the Revolution: A Dictionary of Provincial and Local Units* (Bloomington, 1978), 135.

foot units could have resulted from an unintended error, or indicative of different workshops using different measures on site. This is a convenient theory, but one that is impossible to prove. On the other hand, if the total length of Hugues's measuring rod corresponds to key measurements found in the cathedral (e.g., the diameter of hemicycle piers), it is likely that the 31.5 cm-foot deduced from Hugues's rod was used in 13th-century Reims, known to the architects responsible for the cathedral as well as to Hugues himself. For this theory to work, Hugues's measuring rod has to represent a length five times of 31.5 cm, yet a measuring unit consisting of five feet was very rare.[43] Instead, it was the *toise*, a well-established unit of six feet that predominated premetric France. In fact, so prevalent was the term *toise*, it was frequently used to refer to the measuring rod as a tool regardless of its actual length, and its usage continued well into the 19th century.[44] For example, when reporting Hugues's tomb slab in 1861, Cerf describes Hugues's image as holding "in his left hand a *toise*."[45]

In the 1840s Prosper Tarbé gives eight *pieds* eight *pouces* by four *pieds* four *pouces* as the overall dimensions of Hugues's slab.[46] In metric terms the slab measures 276 cm × 136.5 cm.[47] Converting the former to the latter, we arrive at a foot (*pied*) length of 31.5 cm, which as discussed earlier is a foot unit which not only existed in premetric Marne but also correlates to certain dimensions at Reims Cathedral. This strengthens the plausibility that 31.5 cm as a foot unit not only applied to medieval Reims but continued to be used well into the 19th century. More importantly, these simple calculations help reaffirm that Hugues's measuring rod, though referred to as a *toise*, does not bear relationship to the historical *toise* of premetric France. For Hugues's rod to be a to-scale

43 To the best of my knowledge, only the *Pas géométrique* as a measuring unit comprises five feet. Alexis Paucton, *Métrologie, ou Traité des mésures, poids et monnoies des anciens peuples et des modernes* (Paris, 1780), 774.

44 Prosper Tarbé, *Essais historiques sur ses rues et ses* monuments (Reims, 1844); idem, *Notre-Dame de Reims* (Reims, 1845); and Isidor Taylor, *Reims: La Ville des Sacres* (Paris, 1860), all gave measurements in premetric units. It should be noted that more general terms, such as *canne*, *baton*, and *baguette* have also been used to describe the long rod held by an architect.

45 "Il tient de la main gauche une *toise*, et dans la main droite un petit monument qui représente le pojet de la basilique de St.-Nicaise." Cerf, *Histoire et Description*, 2:385.

46 Tarbé, *Essais historiques*, 275.

47 Establishing exact measurements is tricky business. I took the measurements (given here in metric) from the outside edges of the rather thick (2–3 mm) lead lines; they were confirmed by Marie-Thérèse Zenner. John James, known to be exceedingly meticulous, provides a slightly different reading: "2,740 mm high and … half as wide." James, "The Tools of Hues Libergier," 143.

depiction of an actual six-*pieds toise*, it would have to measure 189 cm in length. If the engraved rod does not represent an actual tool, does the engraved square represent an actual square? And, what about the image of Hugues himself, which appears as life-sized as the instruments next to him?

The overall dimension of the image of Hugues measures 210 cm from the tip of his hat to that of his toes. If we subtract 23 cm from the total height to account for the tiptoeing, Hugues at 187 cm would still be considered tall by modern standards and certainly for a 13th-century adult male.[48] To locate Hugues's engraved image in the context of medieval effigies in general, we find helpful a list of 13th-century English effigies by H.A. Tummers.[49] Of the 213 effigies examined, 42 measure 200 cm (6'6") or more, 26 between 190 cm and 200 cm (6'3" to 6'6"), and 15 between 180 cm and 190 cm (5'11" to 6'3", a category to which Hugues belongs). In other words, 83 effigies—or more than one-third of the effigies surveyed—are longer than five feet eleven inches. These rather impressive heights, however, are not supported by dimensions of human skeletons excavated from a medieval cemetery at Saint Nicholas Shambles in London.[50] Of the 234 skeletons buried near the parish church, adult men ranged from a little over 159 cm to 182 cm, while adult women were between 125 cm and 174 cm.[51] On average, the height of adult male is about 172 cm, and that of female, 157 cm. All told, only four adult males were taller than 180 cm. The range of human statures extracted from the Saint Nicholas Shambles is consistent with measurements obtained from at least 14 other medieval burial sites in England. The height of male skeletons from the Saxon period through the 16th century, from Kent to Durham, ranged between 165 cm and 178 cm.[52] The engraved image of Hugues, as mentioned earlier, measures 187 cm in height.

French effigies from the same period yield comparable results. The 13th-century effigy of a knight from the d'Aluye family at the Cloisters Museum (25.120.210), for example, measures about 185 cm from cranium to

48 According to a 1981 report, average height of modern British men is 173 cm. "Adult Heights and Weights Survey," Office of Population Census and Surveys, ref. 5581/1. I thank Stephanie Pinter-Bellows for this information.

49 Harry Tummers, *Early Secular Effigies in England: The 13th Century* (Leiden, 1980), 135–47.

50 William White, *Skeletal Remains from the Cemetery of St. Nicholas Shambles, City of London* (London, 1988), especially "Appendix I: Catalogue of Skeletons," 56–69.

51 Of all the skeletons complete enough for calculating body height, five are just under six feet. Only one is over six feet in stature.

52 White, *Skeletal Remains*, 31.

FIGURE 8.4 A Knight of the d'Aluye Family. French, after 1248-by 1267.
THE METROPOLITAN MUSEUM OF. ART, THE CLOISTERS COLLECTION, 1925 (25.120.201)
REPRODUCED BY PERMISSION OF THE MMA

heel (Figure 8.4).[53] The effigy of Margaret of Gloucester in the same collection (53.137), also of the 13th century, measures a whopping 193 cm.[54] In short, the dimensions of tomb effigies tend not to reflect actual human statures. The carved figures are considerably longer than actual human stature, likely resulting from the need to "fill" the surface of the tomb slab which, having to account for the full dimensions of the casket below, is necessarily larger than the human remains contained within. These examples from both sides of the Channel demonstrate overwhelmingly the improbability that the engraved image of Hugues replicates the actual height of the architect. Similarly, the engraved images of his instruments are unlikely to portray actual instruments, or the ones he used personally.[55]

Our knowledge about the roles of medieval architects remains incomplete, especially before the 13th century, when their names began to emerge.[56] The labyrinth at Reims Cathedral, generally dated to the late 13th century and destroyed in 1779, incorporated images and names of "the first architects of the Gothic monument": Jean d'Orbais, Jean le Loup, Gaucher de Reims, and Bernard de Soisson.[57] In nearby Amiens, Robert de Luzarches then Thomas and Renaud de Cormont were responsible for the construction of its cathedral;[58]

53 Barbara Boehm and Melanie Holcomb, eds., *Jerusalem, 1000–1400: Every People under Heaven* (New York, 2016), 211.

54 William Wixom, "Medieval Sculptures at The Cloisters," *The Metropolitan Museum of Art Bulletin*, n.s. 46 (1988–89), 59.

55 In discussing images of architects as self-portraits, Gallet laments that Hugues's face was too standardized to portray any distinctive features. The same should apply to the tools. Yves Gallet, "Autoportrait et représentation de soi au Moyen Âge: le cas de Matthieu d'Arras à la cathédrale Saint-Guy de Prague," in "Autoportrait et Représentation de l'Individu," ed. Élisabeth Gaucher-Rémond, *Le Moyen Âge*, 122, no. 1 (2016), 59.

56 For a brief discussion of pre-13th century architects, see Erlande-Brandenburg, *Cathedrals and Castles*, 51–54. For 13th-century architects, see Nicola Coldstream, "The Architect, History and Architectural History," *Transactions of the Royal Historical Society*, 13 (2003), especially 221–26, and idem, "Architectural Designers in the Thirteenth Century," in *Thirteenth Century England IX: Proceedings of the Durham Conference, 2001*, ed. Michael Prestwich, Richard Britnell, and Robin Frame (Woodbridge, 2003), especially 204–06. See also Woodman, *op.cit*.

57 The bibliography on the Reims labyrinth is extensive. See R. Branner, "The Labyrinth of Reims Cathedral," *Journal of the Society of Architectural Historians* 21, no. 1 (1962): 18–25; Louis Demaison, "Les architectes de la cathédrale de Reims," *Bulletin archéologique* (1894), 1–40; and idem, "A propos de Jean d'Orbais," *Bulletin de la Société nationale des antiquaries de France* (1932), 153–54. See a recent summary in Bruno Chauffert-Yvart, "L'architecture: le genie des bâtisseurs," in *Reims: la grâce d'une cathédrale*, dir. Thierry Jordan (Strasbourg, 2010), 132–35. The quote here is from Branner, *op.cit.* 18.

58 Stephen Murray, *Notre-Dame, Cathedral of Amiens: The Power of Change in Gothic* (New York, 1996), 82–86.

while in Paris, Jean de Chelles and Pierre de Montreuil busied themselves updating major monuments in the latest Rayonnant fashion.[59] With so many magnificent buildings under construction, architects gained recognition as creative professionals with the necessary expertise to oversee increasingly complex designs and operations. "Answerable to no-one," master mason's privilege grew increasingly; some of whom were memorialized with "handsome tombs."[60] The depiction of Hugues standing under a trilobed arch while holding the model of a church, belongs to a contemporary tombstone type shared by royals as well as distinguished citizens alike.[61] A sartorial touch, with a "bonnet des docteurs" and "academic gown," seems to reaffirm his elite status, one that "would not look out of place in many European academic processions today."[62] Originally buried near the portal in the nave of Saint-Nicaise, a prestigious location typically reserved for important prelates (such as Bishop Evrard de Fouilloy at Amiens), the placement of Hugues's tomb further demonstrates the social position enjoyed by the architect.[63] It is in this context that we should consider the tomb slab of Hugues Libergier as a monument to the architect of a royal abbey in the coronation city.

That the square, compass, and measuring rod are "implements representing [the architect's] expertise," thus emblematic of the profession, is of course long recognized.[64] Coldstream puts it succinctly: "In illustrations of patrons and masons in conference, it is the patron who expresses his will; but it is the master mason who carries the drawing instruments."[65] When engraved so realistically on a 13th-century tomb slab, they deserve to be studied and

59 Branner, "Paris and the Origins of Rayonnant Gothic Architecture Down to 1240," *Art Bulletin* 44, no. 1 (1962): 39–51; Louis Grodecki, "Pierre, Eudes et Raoul de Montreuil à l'abbatiale de Saint-Denis," *Bulletin monumental* 122 (1964), 269–74; Prache, "Un architecte du XIII[e] siècle et son oeuvre," *Dossier d'histoire et d'archéologie* 47 (1980): 26–38; Michael Davis, "Splendor and Peril: The Cathedral of Paris, 1290–1350," *Art Bulletin* 80, no. 1 (1998): 34–66; Maxime L'Héritler, "Le chantier de l'Abbaye de Saint-Denis à l'époque gothique," *Médiévales* 69 (2015): 129–48; and Albrecht et al, *Die Querhausportale der Kathedrale Notre-Dame in Paris: Architektur, Skulptur, Farbigkeit* (Petersberg, 2021), 64–77.

60 Coldstream, *Masons and Sculptors*, 15–18. See also Woodman, "For Their Monuments."

61 Klinkenberg, *Compressed Meanings*, 217 and Chauffert-Yvart, "L'architecture," 130.

62 Binski, "'Working by Words Alone.' The Architect, Scholasticism and Rhetoric in Thirteenth-Century France," in *Rhetoric beyond Words: Delight and Persuasion in the Arts of the Middle Ages*, ed. Mary Carruthers (Cambridge, 2010), 29; idem, *Medieval Death*, 91; and Woodman, "For the Monuments," 178–79.

63 Binski, 29. Woodman, *op.cit*.

64 Binski, *op.cit*.

65 Coldstream, "Architectural Designers in the Thirteenth Century," 207.

scrutinized in every way possible.[66] Through these rigorous exercises we move closer to understanding the practical functions of these tools. The challenge, though, is to distinguish the representational from the symbolic. In the case of the tomb slab of Hugues Libergier, despite the intense and persistent attention given to his instruments, they should be regarded as symbols of his profession. Paul Binski suggests that the instruments not only "symbolize the science of geometry" but also the architect's "conceptual and 'political' sovereignty as an *auctor*."[67] Indeed the square, along with the measuring rod and compass, signify the increasing recognition and prestige bestowed on architects such as Hugues Libergier, the *auctor* who commenced the Abbey of Saint-Nicaise.

Dedication

This chapter is dedicated to William W. Clark.

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66 A recent book, as of this writing not yet available in the United States, considers the application of the Persian mathematician al-Buiruni's science in Europe, including a geometric analysis of Hugues's tomb slab. Caterina Marrone and Angela M. Venger, *La tradizione dei Maestri costruttori, Quaderno. 1: La lapide tombale di Hugues Libergier* (San Demetrio Cerone CS, 2021).

67 Binski, "'Working by Words Alone,'" 29.

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CHAPTER 9

Like Clockwork: Timely Authorial Mechanisms in Guillaume de Machaut

Kathleen Wilson Ruffo

Impressively diverse in scope, the 'worlds' captured in the Portfolio of Villard de Honnecourt are nevertheless unified by a spirit of experimentation and invention that would increasingly drive—and even integrate—endeavors of a technological, scientific, or artistic nature during the late medieval period. A century after this extraordinary portfolio was taking shape, the most celebrated poet-composer of the Valois court began a compilation project of his own that would involve precisely this kind of integration in a bid, one might argue, to reinvent himself. No official documentation survives concerning this initiative, undertaken at some point in the mid-1340s as the author was approaching the age of 50. What has endured, however, is presumably what its creator intended: a marvelous authorial corpus now known as manuscript C (Paris, Bibliothèque nationale de France, fr. 1586), compiled in Paris possibly for Bonne of Luxembourg, wife of Jean le Bon, the future King Jean II of France, under the watchful eye of Guillaume de Machaut himself.[1] Six other manuscripts preserving Machaut's complete musico-poetic œuvre were eventually published but none can match the novelty or number of C's exquisite illuminations, the work of three artists active at the Valois court around the mid-14th century.[2]

1 A digitized version of C is available at gallica.bnf.fr. Connections among Machaut, Bonne, and C are most recently discussed in Lawrence Earp, "Introduction," in *Poetry, Art, and Music in Guillaume de Machaut's Earliest Manuscript* (*BnF fr. 1586*), ed. Lawrence Earp and Jared C. Hartt (Turnhout, 2021), 21–37; Elizabeth Eva Leach, "Machaut's First Single-Author Compilation," ibid., 59–91; Uri Smilansky, "Creating MS C: Author, Workshop, Court," *Early Music History* 39 (2020): 253–304; and Lawrence Earp, "Introduction," in Lawrence Earp, Domenic Leo, and Carla Shapreau, *The Ferrell-Vogüé Machaut Manuscript*, DIAMM Facsimiles, 5 (Oxford, 2014), 31, 35–7.

2 François Avril identifies these artists' hands in "Les manuscrits enluminés de Guillaume de Machaut: essai de chronologie," in *Guillaume de Machaut: Colloque-table ronde organisé par l'Université de Reims* (Paris, 1982), 117–33. Most recent discussions of their work include Margaret Goehring, "Artifice and Ornament in the *Dit dou lyon* Garden Miniature," in *Poetry, Art, and Music*, 217–37; Domenic Leo, "Coming of Age in Guillaume de Machaut's First Illuminated *Dit de l'alerion*," ibid., 239–60; Kyunghee Pyun, "The Master of the *Remede de*

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At the heart of this corpus as it is now bound, there appears a curious contraption, one that was never replicated in later editions of Machaut's work. Crafted by the chief illuminator, the Master of the *Remede de fortune*,[3] this splendid miniature portraying a *Wheel of Fortune* (Figure 9.1) highlights a pivotal moment in the most influential of the five *dits* or narrative poems included in the manuscript. The protagonist of the *Remede de fortune*, a poet who admires a lady at court and composes songs for her, is shown in the upper half of the miniature in a castle garden identified as Hesdin Park in the story. Here, he pens a *complainte* about his failure in love and fortune's cruelty, after fleeing from the lady in a flustered panic. Below, his lament appears in the form of Lady Fortune with her wheel, clearly a didactic import from the Boethian tradition which Sylvia Huot notes is here coordinated with the 'modern' image above of the lover composing at Hesdin to capture the clerical-lyrical fusion of the *complainte*.[4]

Yet, Boethius' 6th-century conceptualization of the wheel—which intrigued many an artist, including Villard (Figure 9.2)—accounts for only part of the picture here, and to my knowledge, no portrayal of this subject before 1350 approaches the complexity or viability of the Remede Master's invention. This is an extraordinary hybrid model that couples standard iconography with cutting-edge technology: while its riders signal established allegories of fleeting fortune or the 'ages of man,' its double-cogwheel actively cranked by Fortune puts an utterly new spin on the subject. Little wonder C's *Wheel* miniature is

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Fortune and Parisian Ateliers *c.*1350," ibid., 195–216; and Kathleen Wilson Ruffo, "Courting Convention, Compiling Context: Chansonnier Iconography and Beyond in Machaut MS C," ibid., 157–93. Essential studies on Machaut's collected works are Sarah Jane Williams, "An Author's Role in Fourteenth Century Book Production: Guillaume de Machaut's 'livre ou je met toutes mes choses,'" *Romania* 90 (1969): 433–54; Lawrence Earp, "Machaut's Role in the Production of Manuscripts of his Works," *Journal of the American Musicological Society* 42 (1989): 461–503; and Lawrence Earp, *Guillaume de Machaut: A Guide to Research* (New York, 1995).

3 So named by Avril, "Les manuscrits enluminés," 119–23; and discussed in Pyun, "The Master of the *Remede de Fortune*" and "Foundation Legends in the Illuminated Missal of Saint-Denis: Interplay of Liturgy, Hagiography, and Chronicle," *Viator* 39, no. 2 (2008): 143–91; Wilson Ruffo, "Courting Convention"; and Domenic Leo, "The Pucellian School and the Rise of Naturalism: Style as Royal Signifier?," in *Jean Pucelle: Innovation and Collaboration in Manuscript Painting*, ed. Kyunghee Pyun and Anna D. Russakoff (London, 2013), 159–60.

4 Sylvia Huot, *From Song to Book: The Poetics of Writing in Old French and Lyrical Narrative Poetry* (Ithaca, 1987), 252. On Boethius's *De consolatione philosophiae* see John Marenbon, *Boethius* (Oxford, 2003); on Machaut's transformation of this source, clearly mediated by the *Roman de la Rose* in which Raison uses the image of fortune's wheel to illustrate love's vicissitudes, see Sylvia Huot, "Guillaume de Machaut and the Consolation of Poetry," *Modern Philology* 100, no. 2 (2002): 169–95.

FIGURE 9.1 Lover-poet composing in Hesdin Park; Wheel of Fortune, MS C, fol. 30v (Paris, Bibliothèque nationale de France, MS fr. 1586)
REPRODUCED BY PERMISSION OF THE BNF

featured on the cover of Patricia Clare Ingham's recent publication, *The Medieval New*.[5] In Machaut's day and long before, actual operating wheels of fortune constructed on a monumental scale for paraliturgical, theatrical, or courtly performances (none of which survive) likely included some of these components,

5 Patricia Clare Ingham, *The Medieval New: Ambivalence in an Age of Innovation* (Philadelphia, 2015).

adapted from existing mill and spinning wheel technology (Figure 9.3).[6] The Villard drawing of fortune's wheel, although distilled to fundamental geometric form and arranged in a composition reminiscent of architectural tracery, nevertheless conveys a similar sense of motion through its articulated, puppet-like riders (Figure 9.2), inspired perhaps by such live performances.[7] The Remede Master's sophisticated mechanism has otherwise led scholars to draw comparisons with the contemporaneous automata of Hesdin Castle mentioned in the *Remede* and known to Machaut and his patrons,[8] and with a specific technological breakthrough introduced to European machinery in the 14th century, the mechanical clock.[9]

In what follows, I aim to further galvanize current critical inquiry, by exploring how the Remede Master's *Wheel of Fortune* miniature launches a highly animated and time-sensitive performance—one that metaphorically underscores Machaut's personal investment in C as a novel form of authorial enterprise undertaken at a critical point in his career. The illuminator's simulation of clockwork-automaton technology, I would argue, is key to this project for several reasons, not the least of which is its unique presentation within a unique Machauldian collection, the first and most luxurious of its kind. The elaborate full-page display of fortune's wheel within the *Remede de fortune*

6 On functioning wheels of fortune dating back to *c.*1100, their technological sources, and literary and philosophical commentary, see *La Fortune: thèmes, représentations, discours*, ed. Yasmina Foehr-Janssens and Emmanuelle Métry, Recherches et Rencontres 19 (Geneva, 2003); Charles Radding, "Fortune and Her Wheel: The Meaning of a Medieval Symbol," *Mediaevstik* 5 (1992): 127–38; and Alan H. Nelson, "Mechanical Wheels of Fortune, 1100–1547," *Journal of the Warburg and Courtauld Institutes* 43 (1980): 227–33.

7 The frontal, symmetrical design of the Villard wheel reappears in other motion-related studies in the Portfolio, such as the 'Perpetual Motion Device' (fol. 5r) and 'Spinning Mason(s), (fol. 19v). It is telling that Jean Wirth places this 'Wheel of Fortune' sketch in the 'Horlogerie' section of his publication, *Villard de Honnecourt: Architecte du XIIIe siècle* (Geneva, 2015).

8 "And I could never describe the marvels, the delights, the artifices, the automata, the watercourses, the entertainments, the wondrous things that were enclosed within" ["Et les merveilles, les dedui, / Les ars, les engins, les conduis, / Les esbas, les estranges choses / Que estoient dedens encloses, / Ne saroie jamais descrire"], *Remede*, lines 813–17, *Guillaume de Machaut: "Le jugement du Roy de Behaigne" and "Remede de Fortune,"* ed. and trans. by James I. Wimsatt and William W. Kibler, music ed. Rebecca A. Baltzer (Athens, GA, 1988), 212–13; all references to the *Remede* in this paper are from this edition. On comparisons with the Hesdin automata, see E.R. Truitt, *Medieval Robots: Mechanism, Magic, Nature, and Art* (Philadelphia, 2015), 128–30; and Elizabeth Eva Leach, *Guillaume de Machaut: Secretary, Poet, Musician* (Ithaca, 2011), 227.

9 Truitt, *Medieval Robots*, 127; Ingham, *The Medieval New*, 194–96; Julie Singer, *Representing Mental Illness in Late Medieval France: Machines, Madness, Metaphor*, Gallica 43 (Cambridge, 2018), 66–68; and Julie Singer, "Clockwork Genres: Temperance and the Articulated Text in Late Medieval France," *Exemplaria* 21 (2009): 234–36.

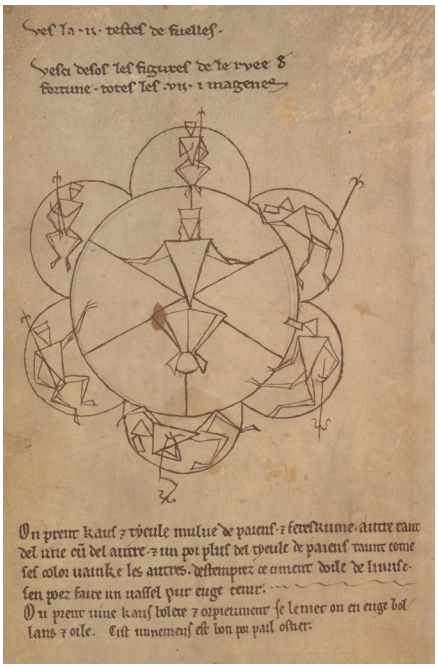

FIGURE 9.2
Portfolio of Villard de Honnecourt, fol. 21v: Wheel of Fortune (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

section of C is also telling, since this most lavishly illuminated fascicle is likely the core around which the whole manuscript was originally conceived by Machaut. The carefully considered physical layout of this fascicle also points to a close working relationship between author and artist.[10] The Remede Master's *Wheel* seems to confirm this collaboration, offering not only ample opportunity to engage with the mechanics of Machaut's innovative craft[11] but also a highly customized mimetic means of demonstrating and working through specific authorial priorities, especially the interrelated concerns of personal control, longevity, ingenuity, and transformation. Reaching beyond conventional iconographic limits, this discussion thus turns to consider the ontological and epistemological implications of such technologically driven imagery, and to explore more explicitly their bearing on Machaut's professional circumstances and renewed sense of self during a time of significant transition at the French court.

10 Anne Stone, "Made to Measure? On the Intimate Relations between Parchment and Text in MS C's *Remede de fortune*," in *Poetry, Art, and Music in Guillaume de Machaut's Earliest Manuscript* (*BnF fr. 1586*), ed. Lawrence Earp and Jared C. Hartt (Turnhout, 2021), 93–131.

11 As other literary and theoretical studies have begun to explore, including Singer, *Representing Mental Illness*; Singer, "Clockwork Genres;" and Ingham, *The Medieval New*.

FIGURE 9.3 Hunters spinning nets and laying traps, *Livre de la chasse de Gaston Phébus*, fol. 53v, early 15th *c.* (Paris, Bibliothèque nationale de France, MS fr. 616)
REPRODUCED BY PERMISSION OF THE BNF

1 Poets, Clocks, Control

Firm evidence regarding C's genesis is somewhat lacking, and as such, has prompted conjecture and also debate as to whether this was in fact a patron- or author-driven commission. The Luxembourg and Valois dynasties have long held sway in the scholarship on C, with aspects of music, lyric, and image largely concentrated upon Bonne of Luxembourg, Jean II (second Valois king), and/or their son (the future Charles V). Likewise, patronage of C is often linked

to Bonne, Jean, or his mother, Jeanne de Bourgogne.[12] Two recent studies—published as this paper was nearing completion—offer alternative interpretations not unrelated to the author-driven agenda I propose here. Deborah McGrady's call to reassess the typical top-down relationship of royal patron to commissioned writer at the later court of Charles V has significant implications for Machaut who, in this scenario, is distinguished from others in the king's service through his "strong critique of all forms of literary oversight by privileged readers, especially through the literary commission, which he presented as a direct threat to the writer's creative liberties."[13] In a rigorous material analysis of C, Uri Smilansky also examines the patron–author dynamic, assigning Machaut far greater agency in this project and suggesting that "its ordering and presentation served Machaut's needs as author more than those of a specific patron."[14] But whereas Smilansky asserts that C is "an artifact embodying cultural capital of wide appeal,"[15] I view this collection as a site-specific and transformative exercise that reimagines the poet-composer's role in response to the unstable and highly competitive reality of the Valois court.

Critically important to these latest theories and to the present argument is the question of timing, since such groundbreaking initiatives as C can often arise in moments of crisis. Machaut's position at court had, in fact, shifted after the death in 1346 of his first patron, John, Count of Luxembourg and King of Bohemia (and Bonne's father), who had formally appointed the poet-composer his almoner in 1330 and, within three years, promoted him to the rank of notary and then secretary. Among the few surviving records detailing Machaut's career, none mention administrative duties at either John's peripatetic court or that of Bonne and the Valois after 1346, only the poet-composer's various clerical benefices and the canonicate at Reims Cathedral which ended in 1377, the year he died.[16] Documentation recently discovered by Andrew Wathey, however, picks up the thread in May of 1349 when Machaut appears in the service of a new patron, Yolande de Bar (of Flanders), a few months before

12 Wimsatt and Kibler, ed., *Guillaume de Machaut: "Le jugement du Roy de Behaigne,"* 32–37; Earp, *Guillaume de Machaut*, 24–26, 78, 213 and relevant sources cited there; Earp, "Introduction," in *Poetry, Art, and Music*, 21–24, 26–28, 50. See also Leo, "The Pucellian School"; Leo, "Coming of Age"; and Leach, "Machaut's First Single-Author Compilation," 64, 66.

13 Deborah McGrady, *The Writer's Gift or the Patron's Pleasure? The Literary Economy in Late Medieval France* (Toronto, 2019), 87.

14 Smilansky, "Creating MS C," 303.

15 Smilansky, "Creating MS C," 303. See also Earp's rebuttal, "Introduction," in *Poetry, Art, and Music*, 50–52.

16 Leach, *Guillaume de Machaut*, 7–33.

Bonne and then Jeanne de Bourgogne fall victim to the plague.[17] Interestingly, it is during the three-year gap in documented patronage that production begins on some of the individual fascicles—certainly the *Remede* section—that now comprise C. It is conceivable that Machaut, as an aging fixture of the court suddenly adrift without a formal patron in 1346, felt a pressing need to compensate, to recover some semblance of control within the authoritative terrain of a book. While his loyalty to Bonne continues during this period and he may have intended C as a gift to her, there is some circumstantial evidence to suggest increasing tension between the poet-composer and Jean le Bon after rumors of an alleged extramarital affair surface.[18] Professional uncertainty, exacerbated perhaps by a mid-life sense of urgency regarding personal legacy, may have stimulated production of C, as much an exercise in self-preservation as self-promotion.

Evidence within the *Remede* section of C suggests that time was indeed of the essence for Machaut. A prosimetrum, the *dit* interweaves narrative—interrupted periodically by the narrator's personal reminiscences—and musical insertions, complete with lyrics and notation on certain pages, that inevitably disrupt chronology and introduce alternative moments/directions for the protagonist (and manuscript user). Such generic and temporal complexity certainly betrays the influence of Boethius's *De consolatione* and the *Roman de la rose*, among other mixed-form and metrically diverse precedents. It also confirms the authorial prerogative to reimagine and alter the experience of time itself, and thus aligns with anthropologist Georgia Born's observation concerning music specifically as "auspicious terrain for retheorizing time and history."[19] This is borne out by the various musical compositions interspersed throughout the *Remede*, as they range from established forms early on in the tale (like the *complainte de fortune*, fol. 30r) to newer fixed-form genres (*virelai*, fol. 51r). If read/sung/viewed sequentially, they chart a kind of historiographical evolution of composition, graphically indexed by the changing technology

17 Wathey's unpublished findings are summarized in Earp, "Introduction," in *Poetry, Art, and Music*, 48–49.

18 Earp details sources concerning these rumors, including one by the "Liègois chronicler Jean Le Bel (writing 1352–61) [who] speaks explicitly of John's revenge for an affair between Bonne and the constable [Raoul de Briennes]," *Guillaume de Machaut*, 24–25. Earp also notes Machaut's "apparent coolness towards king Jean" following Bonne's death, "Introduction," in Earp, Leo, and Shapreau, *The Ferrell-Vogüé Machaut Manuscript*, 31.

19 Georgia Born, "Making Time: Temporality, History, and the Cultural Object," *New Literary History* 46, no. 3 (2015): 362. On Boethius and the *Rose*, see Marenbon, *Boethius*, 146–53; and Eleanor Johnson, *Practicing Literary Theory in the Middle Ages: Ethics and the Mixed Form in Chaucer, Gower, Usk, and Hoccleve* (Chicago, 2013), 19–54.

of musical notation on the page. At the same time, this 'comprehensive' catalogue of known forms collectively affirms Machaut's fluency, virtuosity, and breadth of accomplishment, all of which secures his longevity and effectively renders his music timeless.

If this embedded professional portfolio intermittently alludes to and adjusts time across the *Remede*, the *Wheel of Fortune* miniature explicitly demonstrates it in its accurate rendering of the inner workings of a contemporary clockwork mechanism. Such revolutionary technology introduced the escapement device comprising a crown-wheel integrated with gears below by means of a verge, famously illustrated in Giovanni de' Dondi's horological treatise and incorporated into his astronomical clock at Padua (*c*.1348–64).[20] Constructed on a massive scale as early as 1340 and far more precise than earlier water- or mercury-driven timekeeping devices, the first mechanical clocks marked an unprecedented shift towards the technical restructuring and public presentation of time, displayed as they were in churches, palaces, and civic sites across Europe.[21] And because they afforded a new mechanism by which worldly experience could not only be measured but also manipulated and monopolized, they drew the attention of royalty. Charles V (son of Bonne and Jean) had a magnificent clock mounted on the façade of the Palais de la Cité in Paris by 1370, and decreed that any others in the city should be set to its time and church bells be rung when it struck the hour. Upon sacking Courtrai in 1382, Philip II likewise eyed the city clock, seized it and reinstalled it in his Burgundian capital at the Cathedral of Dijon.[22] Prioritizing technological innovation, this veritable clock fixation precipitated new mechanized views of the world

20 *Tractatus astrarium*, now Padua, Biblioteca Capitolare, Cod. D. 39, fol. 3r. On this treatise and constructed clock, see Silvio A. Bedini and Francis Maddison, *Mechanical Universe: The Astrarium of Giovanni de' Dondi* (Philadelphia, 1966). A modern reproduction of Dondi's *astrarium* is now displayed at the Museo Nazionale Scienza e Tecnologia Leonardo da Vinci, Milan.

21 Essential studies of medieval technology and the mechanical clock phenomenon include Jean Gimpel, *The Medieval Machine: The Industrial Revolution of the Middle* Ages (New York, 1976); Carlo Cipolla, *Clocks and Culture 1300–1700* (New York, 1978); Jacques Le Goff, *Time, Work and Culture in the Middle Ages* (Chicago, 1980); David S. Landes, *Revolution in Time: Clocks and the Making of the Modern World* (Cambridge, MA, 1983); and Rachel Doggett, Susan Jaskot, and Robert Rand, eds., *Time, the Greatest Innovator: Timekeeping and Time Consciousness in Early Modern Europe*, Exhibition at the Folger Shakespeare Library (Washington DC, 1986).

22 The 1380 inventory of Charles's possessions lists several small-scale clocks, some inherited, Landes, *Revolution*, 81–82. On Dijon, see Nicholas Foulkes, *Automata* (Paris, 2017), 88.

and attendant anxieties[23] that inevitably permeated contemporary philosophical thought and literature. From Dante to Henry Suso to Jean Froissart, authors across Europe were intrigued by the clock's allegorical potential to model God's wisdom, the natural order of the universe, virtuous moral conduct, and even the human body and emotional mechanisms of the lover's heart.[24]

By comparison, Machaut-time, ever inflected by the shifting exigencies of story, song, meter, and memory, is more attuned to subtle formal manipulation that often elides temporal experimentation with the topos of fortune's wheel.[25] Anna Zayaruznaya notes, for example, how the repetitive rhymes and musical phrases of the *complainte* in the *Remede* develop an intentional circularity evocative of fortune's spinning wheel, a formal tendency Jacques Boogaart identifies in related motets by Machaut where rhythm is exploited to convey the inconstancy of fortune.[26] Lawrence Earp's analysis of *Qui es promesses / Ha! Fortune / En non est* (M8) posits a particularly enticing connection, not just to fortune's instability but to the image of her double-wheel in C: the motet's structure, wherein four statements of a rhythmic period (9 bars) unfolds in the same time as three statements of tenor melody (12 bars), is mirrored in the 4:3 proportion of the Remede Master's cogwheels.[27]

Whether this connection was specifically arranged in consultation with Machaut or merely a coincidence, there is no question that our illuminator's *Wheel* launches a kinetic illusion that is otherwise loaded with peculiar

23 Cf. Pomel's observation regarding clock imagery as "un moyen … de construire un temps subjectif tout en conjurant les angoisses associées à un temps linéaire et irreversible," "Introduction," in *Cloches et horloges dans les textes médiévaux: mésurer et maîtriser le temps*, ed. Fabienne Pomel (Rennes, 2012), 31–32.

24 Lynn White Jr., "The Iconography of Temperantia and the Virtuousness of Technology," in *Action and Conviction in Early Modern Europe*, ed. Theodore K. Rabb and Jerrold E. Siegel (Princeton, 1969); John Scattergood, "Writing the Clock: The Reconstruction of Time in the Late Middle Ages," *European Review* 11, no. 4 (2003): 453–74; Julie Singer, "L'horlogerie et la mécanique de l'allégorie chez Jean Froissart," *Médiévales* 49 (2005): 155–72; Nancy Mason Bradbury and Carolyn P. Collette, "Changing Times: The Mechanical Clock in Late Medieval Literature," *The Chaucer Review* 43, no. 4 (2009): 351–75.

25 Again, Boethius's discussion of fortune's wheel in *De consolatione* is relevant, as a means of understanding divine providence (Book 2) and atemporality (Books 4–5). I thank Jonathan Morton for highlighting these connections.

26 Anna Zayaruznaya, "'She has a wheel that turns …': Crossed and Contradictory Voices in Machaut's Motets," *Early Music History* 28 (2009), 195–96; Jacques Boogaart, "'O series summe rata': De motetten van Guillaume de Machaut. De ordening van het corpus en de samenhang van tekst en muziek," PhD diss. (Universiteit Utrecht, 2001), 130–47, 491–93. On fortune's wheel as a "modèle formel" for Machaut's *Voir Dit*, see Jacqueline Cerquiligni, *"Un engin si soutil": Guillaume de Machaut et l'écriture au XIVe siècle* (Paris, 2001), 56–63.

27 I am grateful to Lawrence Earp for sharing this insight.

temporal significance. The animated portrayal of Lady Fortune cranking her contraption clearly deviates from the relatively static convention of her standing or sitting at the hub of a single wheel which she sometimes holds by the rim or spokes (Figures 9.2 and 9.4). Likewise, the crank device connected to the Remede Master's machine—a *double*-cogwheel no less—is rarely portrayed before 1400.[28] None of these pictorial details is mentioned in the *Remede* itself, yet in the context of this *dit*, such a lively (and complex) performance is rather appropriate as Fortune dislodges the lover-poet from his stalled stupor and provides the motivational momentum to compose the *complainte*. The mechanics of her contraption virtually capitalize on this productive paradox, its interlocked wheels driving contrary motion (unfortunate circumstances) capable of unleashing output (creativity). In effect, the illuminator's simulated gear-train models concurrent *and* recurrent actions that nevertheless signal progress[29] just as the real technology of mechanical clocks shifted time measurement from continuous process (like the flow of liquid in a clepsydra) to repetitive, cyclical and oscillating movement (of the cogs and escapement mechanism). The concept of time adjusts here accordingly, expanding beyond linear *Chronos* to encompass the temporal alternative of *Kairos*, a propitious but fleeting moment calling for expedient action.[30] As if to underscore this time-shift in the miniature, Lady Fortune dons a fluttering blindfold, a rather telling detail reminiscent of the windswept forelock of ancient *Kairos/Occasio* personified.[31] The swift and decisive action associated with *Kairos* directly

28 The earliest depictions of fortune cranking a single wheel emerge in the 12th century: a marginal drawing added to a 10th-century edition of Gregory's *Moralia in Job* (University of Manchester Library, Rylands lat. MS 83, fol. 214v); and Herrad of Landsberg's *Hortus Deliciarum* (former Strasbourg MS, fol. 215, destroyed), reproduced in Tamotsu Kurose, *Miniatures of Goddess Fortune in Medieval Manuscripts* (Tokyo, 1977), pl. 94. On 15th-century images and significance of the crank, see Singer, *Representing Mental Illness*, 64–68.

29 Cf. Gilles Deleuze, *Difference and Repetition*, trans. by Paul Patton (New York, 1994), 90: "repetition is the historical condition under which something new is produced"; and Joan Ramon Resina and Christoph Wulf, eds, *Repetition, Recurrence, Returns: How Cultural Renewal Works* (Lanham, 2019). Compare the more negative reading of Fortune's timing as erratic, based on the *complainte* lyrics, in Singer, *Representing Mental Illness*, 66.

30 Phillip Sipiora and James S. Baumlim, eds., *Rhetoric and Kairos: Essays in History, Theory, and Praxis* (Albany, 2002); and Barbara Baert, *Kairos or Occasion as Paradigm in the Visual Medium: "Nachleben", Iconography, Hermeneutics* (Leuven, 2016).

31 The antique conception of *Kairos* was also associated with wheels, Rudolph Wittkower, "Chance, Time and Virtue," *Journal of the Warburg Institute* 1 (1937–38), n. 5. Simona Cohen discusses medieval comparisons of Fortune's wheel and *Kairos*'s forelock in *Transformations of Time and Temporality in Medieval and Renaissance Art* (Leiden, 2014), 201–06, figs. 91–92.

implicates the *Remede* lover-poet as well, but takes a darker turn as his composition of the *complainte* deteriorates into an excessively prolonged, belabored, and self-centered affair,[32] aptly reflected in the Narcissus-inflected scene of him above the *Wheel* sitting by a spring in Hesdin Park. If the *Wheel*'s technology harnesses an illusion of productive progress and/or auspicious opportunity, it couples it with ironic commentary on the lamenting lover and his interminable *complainte* as a questionable study in the right timing, love's labor, and prudent self-regulation.[33] Yielding subtle ethical insight concerning human potential, choice, and proactivity, the Remede Master's mechanism can thus enlighten and empower the manuscript user with the knowledge of conduct (un)becoming, and the wisdom to weigh the *complainte*'s meaning carefully in her/his own time.

A subversively didactic image that promotes/demotes the lover-poet, the Remede Master's miniature also generates ontological tension in its portrayal of a machine comprising human, personified, and technological parts, at once organic *and* mechanical, actual/historical *and* allegorical, moving *and* static. In effect, the *Wheel* prompts "open-ended movements of becoming," to borrow Jeff Cohen's words regarding the medieval confluence of mechanized time, movement, and identity.[34] Such latitude inevitably destabilizes fortune's convention and opens up alternatives. The riders upon the wheel, for instance, cycle between conventional and contemporary readings in current scholarship: E.R. Truitt assumes them to be "the usual figures representing the reigning favorite of Fortuna, the one without reign, and the one who will reign again" while Domenic Leo theorizes a direct connection to the Valois, the youthful riders viewed as Bonne's three eldest sons, with the dauphin atop the wheel in a highly personalized, instructive reminder of royal duty.[35] I wonder, though, if this last rider also attests to Machaut's tendency to self-promote within the temporally complex *Remede*, structured as a retrospective account by an aging narrator who relives his youthful past at court, conveyed through song and miniature. Corresponding directly with the narrator's repeated description of his

32 Leach suggests a late medieval audience would find the protracted *complainte* "musically ridiculous," *Guillaume de Machaut*, 229.

33 Relevant here is Cicero's definition of *Prudentia*, with its epistemological, moral, and temporal dimensions: "Prudence is the knowledge of what is good, what is bad and what is neither good nor bad. Its parts are memory, intelligence and foresight," Cicero, *De inventione*, II, LIII, 160, ed. and trans. by M.H. Hubbel (Cambridge, MA, 1949; repr. 1968), 326–27.

34 Jeff Cohen, *Medieval Identity Machines* (Minneapolis, 2003), 3.

35 Truitt, *Medieval Robots*, 129; Leo, "The Pucellian School," 161, echoed by Leach, *Guillaume de Machaut*, 227, and Earp, "Introduction," in Earp, Leo and Shapreau, *The Ferrell-Vogüé Machaut Manuscript*, 34, n. 41.

C est vien p. argumēt prouable
C ōm cī fortune est ē la roe les pers lēdz
Quer la debouneire et la mole
Leur ments et les boule et afole

FIGURE 9.4 Wheel of fortune, *Roman de la Rose*, fol. 36r, *c.*1330 (Paris, Bibliothèque de l'Arsenal, MS 5209)
REPRODUCED BY PERMISSION OF THE BNF

younger self as childish, innocent, and naïve,[36] the young boy riding high also wears the distinctive attribute of a pink hat which he shares with the *Remede* lover-narrator and also the lady. Two more figures pictured elsewhere in C don the same cap: the god of love throughout the *Dit dou Vergier* (e.g., fol. 94r) and the narrator of the *Jugement du Roy de Behaigne* (e.g., fol. 1r). The latter figure, together with the *Remede* lover, are often correlated with the textual 'Machaut,' his author-persona or even his historical self.[37] By association, then, our young rider forever atop the *Wheel* may well encompass this prismatic Machaut, his perpetual good fortune at the Valois court one of the key issues at stake in this scene of *suspended* animation.[38]

36 E.g., *Remede*, lines 135–39. Not all wheel of fortune images depict kings, and some portray only youthful riders; the number of riders can vary as well, as in the Villard sketch (Figure 9.2) or *Rose* manuscript (Figure 9.4) here. See also Adam de la Halle's *Jeu de la feuillee* (*c.*1276), where Fortune's wheel operates in the streets of Arras and its riders include local bankers and councilors, discussed in Nelson, "Mechanical Wheels," 228–29.

37 On the layered and elusive Machauldian *je*, see Kevin Brownlee, *Poetic Identity in Guillaume de Machaut* (Madison, 1984); and Helen Swift, "The Poetic 'I,'" in *A Companion to Guillaume de Machaut*, ed. Deborah McGrady and Jennifer Bain (Leiden, 2012), 15–32.

38 Cf. Machaut's rondeau, *Ma fin est mon commencement*, which exploits a generic cyclical structure to generate yet obfuscate authorial identity, graphically animated in the mise-en-page of another complete-works manuscript (Paris, BnF, fr. 22546, fol. 153r).

2 *Engin*, Metal, Magic

Such pictorial time-tampering is entirely consistent with the *Remede* as a pseudo-autobiographical tale that presses control issues further in the interest of a desired version of reality. On a micro-level, this mimetic intention directly engages with the illusion of the *Wheel* as a clockwork automaton driven by Fortune. Simulating technology that in turn mimics the real, the artist's contraption may well reference the actual automata at Hesdin, designed to impress, amuse, or beguile visitors like Bonne and Jean, but it also triggers more complex associations with artificial processes of (re)generation, (re)production, imitation, and transformation that essentially underpin any creative human endeavor. The Remede Master's apparatus itself models a generative act of sorts, as it compiles convention with innovation to effectively reboot iconographic matter and convert fortune's wheel from allegorical emblem to spectacular event. This is very much in keeping with the development of mechanical clockworks by the mid-14th century, when clocks began to incorporate bell-striking *jacquemarts* and other parading figures that transformed time into a delightfully animated pageant.[39] Distancing mechanism from spectator, these clockwork characters and the spectacles they enacted nevertheless carried ambivalence as ingenious technological simulations of 'reality,' and indeed, divine creation itself.

Contrivance and pretension propelled such performances that necessarily involved the operative of *engin*, a wonderfully equivocal term based on the medieval Latin *ingenium* signifying variously a mechanical device (engine, machine, automaton, invention), a mental faculty (intelligence, imagination, inventiveness, wit), or cunning stratagem (scheme, ruse, trap, deception).[40] Encompassing both cognitive/intellectual and technological/artificial processes, the late medieval concept of *engin* also melded the organic and inorganic, thus providing, as Julie Singer points out, an important context for a

39 The earliest recorded (now lost) were at Cluny Abbey (*c.*1340) where figures emerged from the clock cabinet to enact the Annunciation; and Strasbourg Cathedral (*c.*1352–54) which featured automated figures of the Virgin, three Magi, and a crowing rooster, Cipolla, *Clocks and Culture*, 44–47.

40 "Ingenium," *Französisches Etymologisches Wörterbuch*, 685–89; "Engin," *Dictionnaire du moyen français*, available at http://www.atilf.fr/dmf/definition/engin, accessed 12 January 2017. See also Fabienne Pomel, "Représentations mécaniques," in *Engins et machines: L'imaginaire mécanique dans les textes médiévaux*, ed. Fabienne Pomel (Rennes, 2015), 17–19; Jonathan Morton, "Ingenious Genius: Invention, Creation, Reproduction in the High Middle Ages," *L'Esprit Créateur* 55, no. 2 (2015): 4–19; Stephen Perkinson, "*Engin* and *Artifice*: Describing Creative Agency at the Court of France, c. 1400," *Gesta* 41, no. 1 (2002): 51–67.

"machine-like figuration" of mental function and/or human experience,[41] and it is precisely this human–machine interconnection that is captured in the Remede Master's *double* wheel driven by Fortune. Significantly, this slippery, double-edged nature of *engin* resurfaces towards the end of the *Remede*, in a description of musicians attending the lady's banquet:

> And there were musicians more skilled and knowledgeable in both the new and old styles, and who could sing better than Music, who forges songs, or Orpheus, who sang so well that he enchanted all the inhabitants of Hades …[42]

No doubt intended to praise the musical accomplishment of Machaut's day, this passage also reveals the poet's capacity for witty wordplay: the original French here consciously aligns songs/singing (*chans/chanter*) and the act of composing music (*forge*) with two specific methods of mechanical production that, traditionally, pit human *engin* against divine/supernatural creation: forging and enchantment. Such means of manufacture, which have a direct bearing on Lady Fortune's portrayal in C, disclose specifically authorial preoccupations as well.

The metal forge—as an ancient locus of memory and writerly practice—demonstrated productivity through mechanical acts of re-membering/re-composition. In so doing, however, it exposed human shortcoming: God alone creates *ex nihilo*, Nature procreates, and mortals can only imitate.[43] Humanity's limited lot thus invites comparison with C's depiction of Lady Fortune cranking her automaton-inspired *engin*, for according to literary convention, she is only capable of artificially assimilating and mechanically mimicking appearances—and so she does in C, by becoming virtually indistinguishable from all the courtly ladies portrayed throughout the *Remede* with their plaited hair and fashionable gowns. But there is another metal-based component to Lady Fortune's forged identity here. The late medieval understanding of her mutable nature also associated fortune with the practice of alchemy and those who

41 Singer, *Representing Mental Illness*, 60, 45–48.

42 "Et s'i ot des musicïens / Milleurs assez et plus scïens / En la vieus et nouvelle forge / Que Musique qui les chans forge, / Ne Orpheüs, qui si bien chanta / Que tous ceaus d'enfer enchanta / Par la douçour de son chanter," *Remede*, lines 4001–07.

43 Elizabeth Eva Leach, "Nature's Forge and Mechanical Production: Writing, Reading, and Performing Song," in *Rhetoric Beyond Words: Delight and Persuasion in the Arts of the Middle Ages*, ed. Mary Carruthers (Cambridge, 2010), 72–95.

dabbled in such pseudoscientific metallurgy.[44] Again, the Remede Master alludes to this relationship in a second miniature in the *complainte* section, based on an episode from Daniel (2:31–45). Allegorizing the ephemeral nature of kingdoms, the *Dream of Nebuchadnezzar* (Figure 9.5) was clearly relevant to a royal audience,[45] but the statue pictured here is significantly mediated by the lyrics of the *complainte* that carry more specific intention. Following a standard clerical summary of it as a symbol of impermanence in the opening stanzas, the lover digresses from the biblical-exegetical convention to ascribe the composite metalwork of the statue (gold head, silver chest and arms, bronze torso and thighs, iron legs, iron and clay feet) to Lady Fortune herself.[46] Even more remarkably, the *complainte* description fuses two specific metals with the notion of deceit, declaring Fortune's iron legs to be "a cover and a ruse," and her gold head, a vessel of wealth that deludes "the fools she flatters."[47] The Remede Master's rendering of the dream-statue likewise emphasizes gold and iron to the exclusion of the other metals, in contrast to his more complete depiction of the statue in Jean le Bon's contemporary *Bible historiale*.[48] It also incorporates the curious detail of crossed eyes. While consistent with descriptions of Fortune as blind, squint-eyed, or duplicitous, these eyes may also reference the otherworldly duality of this dream scene where the familiar/intelligible/natural might coalesce with the strange/imagined/artificial, as is often the case in medieval processes of *compilatio*, *inventio*, and *ingenium*.[49] The selectively edited image of the dream-statue in C does seem to underscore Machaut's own authorial *engin*: his textual amalgamation of the dream-statue and Fortune effects a surprising transformation, one that fundamentally reorients convention while positioning the poet as essential, authoritative (re)

44 Roger Dragonetti, "Le 'singe de nature' dans le Roman de la Rose," in *La musique et les lettres: études de littérature médiévale* (Geneva, 1986), 369–80; Catherine Attwood, *Fortune la contrefaite: l'envers de l'écriture médiévale* (Paris, 2007), 41; Antoine Calvet, "L'influence du Roman de la Rose dans les textes alchimiques des XIVe et XVe siècles," *in Jean de Meun et la culture médiévale: littérature, art, sciences et droit aux derniers siècles du Moyen Âge*, ed. Jean-Patrice Boudet, Philippe Haugeard, Silvère Menegaldo, and François Ploton-Nicollet (Rennes, 2017), 175–85.

45 Cf. Julie Singer's discussion of the political resonances of the dream-statue in 15th-century French literature, *Representing Mental Illness*, 68, 131–34; a recent summary of exegetical and literary sources on the statue is provided in Anna Zayaruznaya, *The Monstrous New Art: Divided Forms in the Late Medieval Motet* (Cambridge, 2015), 142–72.

46 *Remede*, lines 1017–18.

47 *Remede*, lines 1021–25.

48 London, British Library, Royal MS 19 D II, fol. 381r.

49 Mary Carruthers, *The Craft of Thought: Meditation, Rhetoric and the Making of Images, 400–1200* (Cambridge, 1998), 99–105, 173–76.

FIGURE 9.5 Dream of Nebuchadnezzar, MS C, fol. 31v (Paris, Bibliothèque nationale de France, MS fr. 1586)
REPRODUCED BY PERMISSION OF THE BNF

interpreter of the Daniel episode. Recasting Fortune in the preferred materials of forging, alchemy, and automaton construction, the *complainte* text also coordinates with Fortune's contraption pictured on the previous folio (Figure 9.1), its wheels metallicized with real gold leaf as a material reminder of the luxurious royal environment in which C was assembled, and the mechanical marvels that increasingly preoccupied it.

Such modifications to the *Dream* in C reveal the cunning strategies deployed by author and artist alike to elicit the unexpected from their base material. Both, furthermore, summon illusionistic potential from their material, as the reference cited above to Orpheus charming the inhabitants of Hades suggests. Machaut's punning use of the term *enchantement* conflates the act of composing song with music's power to bewitch, and thus consciously invests

the composer's craft with magical properties. In fact, the opening lines of the *Remede* indirectly link authorial endeavor/fiction/writing to magic, by comparing youthful innocence to the impressionable quality of wax.[50] Embedded within this analogy is both an explicit reference to contemporary writing tablets containing wax (which Machaut would have used) as well as a more subtle allusion to wax as the pliable medium of enchantment that could be fashioned into a receptacle-embodiment of the supernatural.[51] Magic's reliance upon such a physical proxy can relate, in Machaut's world, to a Pygmalion-inspired *ymage* of the lady as a captivating yet false, potentially hazardous fabrication, famously developed in his *Voir Dit*. So too, the Remede Master is mindful of such illusions of the 'real,' but also of those who conjure them, and in two miniatures he introduces a conspicuous extra-narrative detail to underscore their presence: an outrageously feathered turban or hood worn by the lover-poet's companions (Figures 9.6 and 9.7). Such pronounced plumes recall the exotic headdresses of philosopher-magicians in contemporary illuminations, figures typically described in medieval accounts as learned scholars, diplomatic advisors, and moreover, technological engineers charged with designing automated spectacles for the court.[52]

If our illuminator's objective was to assign this conflated identity to the *Remede* companions, then they assume special agency in C. These feathered figures may signal a longstanding ethical preoccupation with human creative presumption or even illicit practice, however increasing royal endorsement of magical and technological productions during the 14th century apparently authorized these figures as invaluable members of the court who, like poets, stood at the nexus of counsel, craft, and contrivance.[53] Observing the

50 "Car le droit estat d'innocence / … est aussi comme la cire / Qui sueffre dedens li escrire," *Remede*, lines 24, 31–32. Cf. Sarah Kay, "Chant et enchantement dans l'œuvre de Guillaume de Machaut: métamorphoses du risque et du désir," *Revue des langues romanes* 118, no. 2 (2014): 447–68.

51 Cf. the magician Nectanebus enchanting wax ships, depicted in London, British Library, Royal MS 20 B XX, fol. 4v.

52 E.g., Merlin with feathered hat in a mid-14th-century edition of *Guiron le Courtois*, London, British Library, Add. MS 12228, fol. 202v. Cf. Philippe Walter, "Merlin en ses métamorphoses: le cor et la plume," in *Cornes et plumes dans la littérature médiévale: Attributs, signes et emblèmes*, ed. Fabienne Pomel (Rennes, 2010), 85–87; Lorraine Daston and Katherine Park, *Wonders and the Order of Nature, 1150–1750* (Cambridge, MA, 1998), 90. One might argue that the feathered headdresses in C simply document contemporary aristocratic fashion, however the Valois taste for extravagantly plumed hats only begins around 1390, well after C's compilation, e.g., Margaret Scott, *Medieval Dress and Fashion* (London, 2007), pl. 77.

53 Re. the 14th-century concept of the magician-poet and connections to Virgil, see John Webster Spargo, *Virgil the Necromancer: Studies in Virgilian Legends* (Cambridge, MA,

FIGURE 9.6
Lover-poet and companion wearing feathered cap (detail of Remede frontispiece), MS C, fol. 23r (Paris, Bibliothèque nationale de France, MS fr. 1586)
REPRODUCED BY PERMISSION OF THE BNF

FIGURE 9.7
Lover-poet with companion wearing feathered headdress (detail of Dancing Courtiers scene), MS C, fol. 51r (Paris, Bibliothèque nationale de France, MS fr. 1586)
REPRODUCED BY PERMISSION OF THE BNF

1934); and Jan Ziolkowski, "Virgil the Magician," in *Dall'antico al moderno: Immagini del classico nelle letterature europee*, ed. Piero Boitani and E. Di Rocco (Rome, 2015), 59–76. On court sponsorship of technology and magic, see Steven Williams, "Public Stage and Private Space. The Court as a Venue for Discussion, Display and Demonstration of Science and Technology in the later Middle Ages," *Micrologus* 16 (2008): 459–86; Scott Lightsey, *Manmade Marvels in Medieval Culture and Literature* (New York, 2007), 64–66; and

action from the sidelines in C, these *enginëors*, together with the lover-poet figure, also draw attention to the interrelated themes of spectacle and specular engagement for the manuscript user, who is inevitably inspired to explore the various marvels that materialize in textual, pictorial, and graphic form across the collection. The companion's feathered cap portrayed in the *Remede* frontispiece (Figure 9.6) elegantly gestures towards this objective: sweeping beyond the frame and fiction of the miniature onto the bare parchment, it brings to mind not only the writer's quill and craft[54] but the tangible reality of C as a spectacular production assembled for the court.

3 Corpus to Marvel

Allusions to machines, metal, and magic underscore the novelty and wonder of this production, while perhaps also serving as subtle commentary on real mechanical marvels collected by the French court. Automata were especially favored by the Valois as a source of diversion, but one marked by the intention of orchestrating behavior through contrived display.[55] A rare surviving witness to such ostentation is the splendid fountain preserved at the Cleveland Museum of Art, similar perhaps to other hydraulically powered mechanisms acquired by several generations of French royalty.[56] This exquisite study in Gothic micro-architecture once provided a rich sensorial spectacle of shimmering gilt-silver and enamel, circulating perfumed water, churning waterwheels, and ringing bells. Eliciting wonder and pleasure from royal audiences, such scintillating, magical displays were nevertheless potentially problematic for Machaut, as competitive mimetic devices that could distract from his own creative contributions to the court, but equally, sources of inspiration, as they manifested the same desire to divert or indeed delude that underlies Machaut's illusive *dits*.

William Eamon, "Technology as Magic in the late Middle Ages and Renaissance," *Janus* 70 (1983): 171–212.

54 Cf. Christine de Pizan's metaphorical use of the quill discussed in Fabienne Pomel, "Cornes et plumes," in *Cornes et plumes*, 220.

55 Daston and Park, *Wonders*, 74, 100; Daniel Fusch, "The Spirited Mind: The Ethics and Epistemology of Early Modern Wonder," *Mediterranean Studies* 17, no. 1 (2008): 183–204.

56 "Table fountain," Paris (?), *c.*1330, Cleveland Museum of Art, Gift of J.H. Wade; discussed in Stephen Fliegel and Elina Gertsman, eds, *Myth and Mystique: Cleveland's Gothic Table Fountain* (Cleveland, 2016). Related hydraulic mechanisms are listed in Jules Labarte, ed., *Inventaire du mobilier de Charles V, roi de France* (Paris, 1879); and Henri Moranvillé, ed., *Inventaire de l'orfèvrerie et des joyaux de Louis I, duc d'Anjou* (Paris, 1903).

Recognizing the power such mechanisms wielded, it is conceivable that Machaut turned to craft his own marvel in a medium both familiar and formidable, long associated with wonder, illusion, and influence. Manuscript C was evidently made in the image of codified authorial collections,[57] but to view it simply as a standard corpus of works underestimates its magic. Empowered by the courtly textual tradition that engendered "the desire for wonderful things" and "both shaped and reflected the taste of … readers,"[58] C tactfully re-presents Machaut (via his lover-poet avatar) as self-deprecating, even fumbling, observer of the court whose craft nevertheless discloses surprisingly valuable lessons. Likely destined for a royal audience, the book also maintains the longstanding practice at court of offering novelties—especially exotic, ingenious, and mechanized curiosities—as ambassadorial or diplomatic gifts invested with special power, while providing that distinctive fusion of finery and ingenuity prized by the Valois. Descriptions of the New Year's *fête d'étrennes* tellingly dwell on such items of exceptional aesthetic and/or material value, or those with intellectual, witty, or playful appeal. One of the most celebrated of these was a 'manuscript' crafted by the Limbourg brothers for Jean de Berry (third eldest son of Bonne and Jean), in fact a wooden box wrapped in velvet and sealed with two silver clasps bearing the duke's insignia.[59] So too, C is ingeniously pretentious in all its multimedia glory, ever transforming into something else, be it story, song, or spectacle, and the Remede Master's miniatures indirectly underscore this, by what they do *not* portray. Whereas later Machaut manuscripts and related literary and/or musical compendia typically feature studious authors with their codices, C seems determined to deny its bookish identity altogether. Devoid of book depictions, it instead transposes the author's œuvre to the real time-space of the manuscript user, and in so doing, orchestrates possible moments of creative encounter in view of the illuminator's miniature courtly world, through recitation of lyrics and singing of notated melodies. It is this potential activation of content—breathing life, as it were, into authorial matter—that recalls automata, especially pneumatically triggered ones and those combining theatrics with a sonic or musical reward. In a very real sense, then, C is set to transform from inanimate collection to vital author-mechanism, devised to

57 Wilson Ruffo, "Courting Convention," 160–73; Leach, "Machaut's First Single-Author Compilation," 67–68.

58 Daston and Park, *Wonders*, 67.

59 Brigitte Buettner, "Past Presents: Near Year's Gifts at the Valois Courts, *c.*1400," *Art Bulletin* 83, no. 4 (2001): 598–625. The Hesdin automata also included a faux book of *ballades* rigged to spray soot or water if opened.

'perform' Machaut's tales for the court again and again.[60] And in this regard, it seals a new kind of diplomatic alliance between author and audience, one made according to Machaut's own terms.

4 Conclusion

Two decades after C's creation, Guillaume de Machaut retired to Reims and the comfort of a large home with a courtyard and garden,[61] a significant measure, presumably, of his professional success. It is quite possible that his inaugural compilation—a luxurious production that would inspire later 'complete-works' editions—favorably influenced his career trajectory. But the larger objective of C was not simply to catalogue an œuvre or pander to aristocratic taste. Coinciding with a period of significant professional upheaval, the timing of this endeavor points to a more profound intention, focused on reinvigorating and perpetuating Machaut's presence, craft, and counsel at court. This discussion emphasizes how vital the Remede Master's *Wheel of Fortune* is to this pressing project, as a novel and compelling mechanism that harnesses the metaphorical potential of technology to interrogate the experience of fortune, time, and reality in Machaut's world, and in so doing, affirm the poet-composer's indispensable contribution to it. Multifarious in scope, the artist's timely *engin* is nevertheless tempered by a charming aesthetic that works wonders for C as a whole, converting it from standard authorial corpus to enchanting (covertly didactic) marvel assembled for the pleasure of the court. Reinventing the wheel here thus entails not only reinventing the book but the author himself, and in the Remede Master's creative hands this becomes a finely tuned and ingenious process, one that runs rather like clockwork.

60 Motion- or air-activated automata featuring music appear in several Old French romances, for example, *Floire et Blancheflor*, discussed in Phyllis Gaffney, "When the wind blows: youthful automata in three Old French poems," in *The Medieval Imagination: "Mirabile dictum,"* eds. Phyllis Gaffney and Jean-Michel Picard (Dublin, 2012), 57–67. See also Sarah Kay, "Circulating Air: Inspiration, Voice and Soul in Poetry and Song," *Paragraph: A Journal of Modern Critical Theory* 41, no. 1 (2018): 10–25. On the virtual remediation of crafted objects, and ontological and epistemological implications, see Alfred Gell, *Art and Agency: An Anthropological Theory* (Oxford, 1998); and Lorraine Daston, ed., *Things That Talk: Object Lessons from Art and Science* (New York, 2004).

61 Earp, *Guillaume de Machaut*, 50, item I.18.1a.

Acknowledgement

My thanks to Amy Gillette and Zachary Stewart for envisioning the 'Enchanted Environs' session at ICMS Kalamazoo that inspired this article. I am also grateful to Mirella Cirfi Walton, Lawrence Earp, Domenic Leo, and Scott Miller for sharing insights on this material; and to George Brooks, Jonathan Morton, and the anonymous reviewer at Brill for helpful comments on earlier drafts of this paper.

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CHAPTER 10

Late Medieval Angel Machines

Amy Gillette

1 Introduction

Scripture, apocrypha, and liturgical, devotional, and philosophical texts proposed many traits and functions for angels. These innumerable and dazzling intelligences were believed to minister to Christ as Priest and King, to have a substantial relation to divine light, to be arranged into a hierarchy through which they revealed divinity to humankind, to act as guardians and guides to the faithful, to battle devils, to rejoice for human redemption, and to lead the worship of all Creation.[1] In particular, the angel-led *Sanctus* hymn ("Holy, Holy, Holy, is the Lord of Hosts; heaven and earth are full of your glory," derived from the seraphic cry of Isaiah 6:3), meant that their celestial liturgy pervaded the entire universe.[2] Scripture and its persistent Neoplatonic interpretation indicated that the sun, moon, and stars took part as well, indicating that the angels' praise tuned in to the music of the spheres.[3]

Passages from such works as the Book of Revelation and the apocryphal Book of Enoch suggested that angels deputized God's will as Prime Mover in operating the mechanisms of the created universe, including the ability to

1 For the angelic nature of the *Sanctus*: F.E. Brightman, ed., *Liturgies Eastern and Western* (Oxford, 1896), 385. For the "angelic hymns" *per se*: Reinhold Hammerstein, *Die Musik der Engel* (Bern, 1962); David Keck, *Angels and Angelology* (Oxford, 1998), 174–79. For the music of angels in art: Hammerstein 1962; Howard Mayer Brown, *A Corpus of Trecento Paintings with Musical Subject Matter* (Durham, NC, 1984–88); Bjorn Tammen, *Musik und Bild im Chorraum mittelaltlicher Kirchen, 1100–1500* (Berlin, 2000); Meredith Gill, *Angels and the Order of Heaven in Medieval and Renaissance Italy* (Cambridge, 2014); and Amy Gillette, *Depicting the Sound of Silence: The Music of Angels in Trecento Sacred Art* (PhD diss., Temple University, 2016), and "The Music of Angels in Byzantine and Post-Byzantine Art," in *Peregrinations* 6, no. 4 (2018): 26–78.

2 Isaiah 6:3 (New International Version); Erik Peterson, *Angels in the Liturgy* (London, 1964), 22.

3 Peterson, *Angels in the Liturgy*, 29–30. Also Hammerstein, *Die Musik der Engel*; Gill, *Angels and the Order of Heaven*; Emanuel Winternitz, "On Angel Concerts in the Fifteenth Century," *The Musical Quarterly* 49, no. 4 (1963): 450–63; Marco Bussagli, *Storia degli angeli* (Milan, 1991), 272–85.

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move human beings both physically and spiritually.[4] Saint Bonaventure (d. 1274) wrote in his popular devotional tract *Mind's Journey into God* that angels "move the celestial bodies; and thus there is attributed to them the administration of the universe by taking over from the First Cause, that is God, their active influence, which they pour out in accordance with the work of governing."[5] Saint Thomas Aquinas (d. 1274) stated likewise in his authoritative *Summa theologica*: "The action performed by the angel who is sent, proceeds from God as from its first principle, at Whose nod and by Whose authority the angels work; and is reduced to God as to its last end."[6] Aquinas explained moreover that angels edified humans in matters of faith and decorum by means of "phantasms":

> The human intellect cannot grasp Truth itself unveiled; because its nature requires it to understand by turning to phantasms. So the angels propose the intelligible truth to men under the similitudes of sensible things. … Moreover, men are enlightened by the angels not only concerning what is to be believed, but also as regards what is to be done.[7]

Aquinas's argument that the angels instruct, necessarily, via sensible things suggests that physical representations of angels were useful to communicate their knowledge of "what is to be believed" and "what is to be done." The pastoral power of images (and music) evidently overrode the fact that angels were technically ineffable. The English mystic Walter Hilton (d. 1396) noted that angels' song "cannot be described by any bodily likeness, for it is spiritual, and above all imagination and reason."[8] Still the images were, as a rule, theologically explicit. For instance, two angels "move the celestial bodies" by cranking the spheres of Creation in a 14th-century manuscript of the *Breviari d'amor* by Matfre

4 Byzantine and Latin theologians who discussed this matter made reference to Plato, Aristotle, the church fathers (e.g., Augustine, Gregory the Great, and John of Damascus), and—when these sources became available in translation—Islamic and Jewish scholars such as Avicenna and Moses Maimonides. For angels in Byzantine art: Glenn Peers, *Subtle Bodies: Representing Angels in Byzantium* (Berkeley, 2001). For Islam: Stephen Burge, *Angels in Islam* (London, 2012); Sara Kuehn, Stefan Leder, and Hans-Peter Pokel, eds., *The Intermediate Worlds of Angels: Islamic Representations of Celestial Beings in Transcultural Contexts* (Beirut, 2019).

5 Bonaventure, *The Soul's Journey into God*, trans. Ewert Cousins (New York, 1978), II. 2.

6 Aquinas, *Summa theologica*, trans. T.C. O'Brien (Cambridge, 1963), I, Q. 112, 1. (For angels *per se*: *ST*, I, QQ. 50–64; for how angels act on human and other bodies: *ST*, I, Q. 110).

7 Aquinas, *ST*, I-I. 111. Cf. Bonaventure, *The Soul's Journey into God*, II.1.

8 Walter Hilton, *Of Angel's Song*, trans. Edmund Gardner, in *The Cell of Self-Knowledge* (New York, 1909), 66.

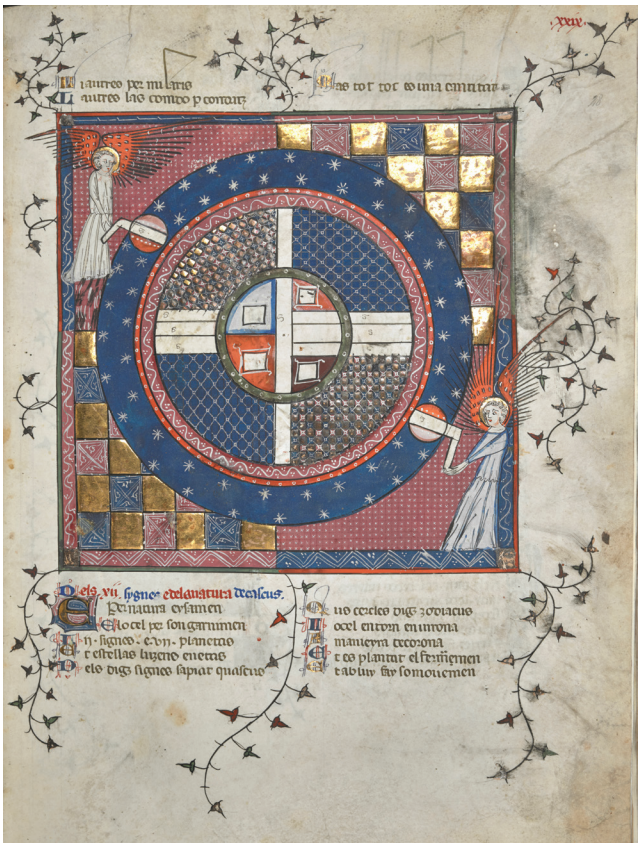

FIGURE 10.1 Breviari d'amor, fol. 45, last quarter of the 14th century (London, British Library, MS Yates Thompson 31)
WIKIMEDIA COMMONS

Ermengaud (fl. 1288–1322) (Figure 10.1).[9] From the 13th century, painters and sculptors created a profusion of angel machines to present "the intelligible truth" through spectacular phantasms.[10] Angel machines seem to have been

9 Copied in BL MS Yates Thompson 31, f. 45.

10 Ibn al-Yahya, a Muslim prisoner who stayed at the Byzantine court after 881, could possibly have seen a mechanical angel, though the angel statue that he described actually seems to have been static, holding up a basin along with a partridge, horse, peacock, elephant, etc.: Alexander Vasilev, *Harun-Ibn-Yahya and His Description of Constantinople* (Prague, 1932), 156–57. Another possible exception: in 1254 a Flemish Franciscan, William of Rubruck, described a supposedly French-built drink-fountain (with wine and milk!) surmounted by a trumpeting angel at the Mongol court. See E.R. Truitt, *Medieval Robots* (Philadelphia, 2015), 34.

unique to Gothic material culture, even though Western angelology and technology stemmed substantially from Byzantine and Islamic sources, which, in turn, developed Hellenistic ones.[11] I use the term "machine" for its varied historical meanings, including: "a material or immaterial structure, especially the fabric of the world or universe," "a material structure designed for a specific purpose," "a (usually moveable) contrivance for the production of stage-effects; also figurative," and "a structure used for conveyance."[12]

This essay considers the settings for which angel machines were created, and the effects that they were meant to provoke. I find that angels—appropriately—adorned devices that registered the movements of the spheres, and enchanted courtly, liturgical, and paraliturgical spectacles involving tangent moments between heaven and earth. Therefore, I propose, the machines were literal embodiments of angelological ideas, making angels "present" as cosmic governors and/or exemplary worshippers (i.e., presenting by phantasms what to believe, and what to do). In preparing this material, I build on two existing courses of approach to medieval machines. Scholars including Franklin Biebl, Valija Evalds, Johannes Tripps, Nerida Newbigin, and Alessandra Buccheri, on the one hand, have published accounts of angel machines specifically as turning-devices, timekeepers, and liturgical and paraliturgical props, respectively. Their focus has been on the reconstruction of complex machines from textual and material records, and on the analysis of the machines' uses in their proper settings. Yet scholars of medieval machines as a category—such as Jean Gimpel, Scott Lightsey, E.R. Truitt, and Minsoo Kang—have described mechanical devices and especially automata as magnificent; wondrous; liminal; hybrids of science, technology, and magic; discursive quasi-objects, whether as the things of "thing theory" or as material-semiotic actors; essents of spatial-materialist ontology, and beyond. I suggest that technology and

11 Machines were known in the early medieval West through texts and the occasional diplomatic gift, such as a water-clock given to Charlemagne in 807 by the Abbasid caliph Harun al-Rashid—but were produced from the 1200s. Automata were introduced in the gardens of Frederick II of Sicily and the Angevin court in Naples. In 1299 Robert II, who had lived in Sicily, constructed automata at the castle of Hesdin in Artois, emulating the economies of wonder and magnificence of the Mediterranean courts: Scott Lightsey, *Manmade Marvels in Medieval Thought and Culture* (New York, 2007), 8; Truitt *Medieval Robots*, 116–36. Robert's daughter Countess Mahaut recorded the maintenance of the automata beginning in 1299; they were repaired in 1432 by Philip the Good of Burgundy: Minsoo Kang, *Sublime Dreams of Living Machines* (Cambridge, MA, 2011), 61–62. For Byzantine automata: Henry Maguire, *Byzantine Court Culture* (Washington, D.C., 1997); for Frederick II: David Abulafia, *Frederick II: A Medieval Emperor* (London, 1988); for Burgundy: Wim Blockmans et al., *Staging the Court of Burgundy* (Turnhout, 2013).

12 "Machine, n." *Oxford English Dictionary Online*. June 2019. Oxford University Press.

angelology were reciprocal factors in the aesthetic efficacy of angel machines in each of the functional categories described below.

2 Cosmic Mechanics

Angels, in their guise as cosmic governors, decorated instruments that measured the motions of heaven and earth (see Figure 10.1). Timekeeping devices and weathervanes were perhaps the most prominent. An early example is an architectural sculpture of an angel holding a sundial (*c.*1145, with later additions) at Chartres Cathedral, on the south tower of the west façade (Figure 10.2).[13] Angels appear, too, on the clock in Wells Cathedral (1386–92, face *in situ* and works in the London Science Museum). Its face portrays a model of the universe rotated by angels in the four spandrels who release the cardinal winds from wind-bags, inspired most likely by Revelation 7:1: "I saw four angels standing at the four corners of the earth, holding back the four winds of the earth" (Figure 10.3).[14]

Angels' power over the winds recommended them, as well, as a fitting subject for weathervanes.[15] Again at Chartres, one shaped as an angel (*c.*1225–35, replaced after a fire in 1836) crested the apse roof above the high altar, connecting the liturgy and the movements of the spheres to the same divine creator and angelic mediators.[16] In Venice, Doge Leonardo Loredan (d. 1521) crowned the formidable campanile of the Piazza San Marco with a massive golden weathervane representing the Angel Gabriel, pointing, whose wings expanded

13 The *in situ* angel is a 20th-century replacement; the original is in the crypt, and may have originally been installed on the Royal Portal. Its wings were added later, perhaps when moved to the south tower. Image credits: https://digital.library.pitt.edu/islandora/object/pitt%3AFCSP19600900 and https://digital.library.pitt.edu/islandora/object/pitt%3AFCSVE4100110.

14 The other oldest survivals are at Salisbury Cathedral (1386, *in situ*) and the Rouen *Gros-Horloge* (1389, *in situ*). The Salisbury and Wells clocks were both most likely commissioned by Bishop Erghum, who was at Salisbury from 1375–88 and Bath/Wells from 1388–1400. Bruton, *Clocks and Watches*, 19. See Carlo Cipolla, *Clocks and Culture* (London, 1967), 42–46, for more Gothic and Renaissance clocks and cosmology, at Strasbourg, Padua, and Bologna.

15 See Eugène de la Quérrière, *Essai sur les girouettes, épis, cretes, et autres décorations* (Paris, 1846), 28, for angel weathervanes atop churches and clocks. "A l'église de Saint-Ouen, se voyait un ange, comme il en existe encore un à Reims sur le choeur de la cathédrale, et à la cathédrale de Toul, près du lanternon de l'horloge." Also Marco Bussagli, "Gli angeli e i venti," *Arte medievale* 2 (1991): 107–26.

16 Images: https://digital.library.pitt.edu/islandora/object/pitt%3AFCSV1R310200 and https://digital.library.pitt.edu/islandora/object/pitt%3AFCSV3R310200.

FIGURE 10.2
Angel Holding Sundial, Chartres Cathedral, *c.*1145
PHOTO: UNIVERSITY OF PITTSBURGH

FIGURE 10.3 Clock face at Wells Cathedral (1386–92)
CORNELL UNIVERSITY LIBRARY, WIKIMEDIA COMMONS

to catch every wind![17] The chronicler Marin Sanudo recorded the ceremony of the weathervane's installation: "1513, July 6. Today in the Piazza S. Marco a gilded copper angel was hoisted up to the sound of trumpets and pipes. Wine and milk were poured upon it in token of rejoicing. Pray God it has been raised in a happy hour and to the increase of this Republic."[18] Sanudo's phrase, "the increase of the republic," carried multiple references: to the campanile's glorious adornment, to the fact that sea-trade was regulated by wind, to the angelic governance of sublunary phenomena, and to the analogy of angels and doges in the heavenly and earthly courts.

"Turning-devices" on the roofs of churches and chapels likewise bridged natural and liturgical time. These apparently surmounted the crossing-tower of the church of Saint-Pierre in Le Dorat, Haute-Vienne (13th century);[19] and two foundations of Jean de France, Duc de Berry (d. 1416): the Sainte-Chapelle in Bourges (1392–97) and the chapel of his chateau at Mehun-sur-Yvre (renovated from 1367), the latter of which the Limbourg brothers depicted in the Duc's *Très Riches Heures* (1411–16) (Figure 10.4).[20] The "ingeniator" Villard de Honnecourt sketched a notional design for such a turning-angel in the 1230s (Figure 10.5).[21] The angel itself is invisible in reproduction because he rendered it in drypoint. Yet its mechanism appears above an eagle meant for installation on a church lectern, to turn toward the deacon while he read the Gospel. It bears the annotation "How to make an angel point its finger always toward the sun" ("Par chu fait on un ange tenir son doit ades vers le solel"),

17 Horatio Brown, *In and around Venice* (New York, 1905). The angel concluded Bartolommeo Buono's restorations (begun in 1510) to the tower's bell-chamber, attic, and pyramid. Inside the pyramid was a cupola through the crown of which passed the angel's pivot. The angel has been replaced several times.

18 The Gabriel weathervane also formed a spatial triangle with the façades of S. Marco and the Torre del Orologio, consummating their ecclesiological-political iconographies.

19 Alain Erlande-Brandenburg, "L'Ange de Saint-Pierre du Dorat," *Bulletin Monumental* 126, no. 4 (1968): 387–88.

20 Biebel, "The 'Angelot' of Jean Barbet," *The Art Bulletin* 32, no. 4 (1950), 341. N.B. The elegant bronze angel now in the Frick Collection—inscribed "Le xxvii^{e} jour de mars / l'an mil cccc lx + xv Jehan Barbet dit de Lion fist cest angelot"—was more likely part of a sculptural group for an altar ensemble or fountain. See also *Sculpture in The Frick Collection: German, Netherlandish, French and British*, vol. 4 (New York, 1970).

21 Jean Gimpel, *The Medieval Machine* (London, 1977), 130–31; also Valija Evalds, "Beards, Clocks and Prophets: The Dial-Bearing Angels at Chartres," in *AVISTA Forum Journal* 20, no. 1 (2010): 3–12. For the designation *ingeniator*: George Brooks, "Villard de Honnecourt: Gothic Carpenter," *AVISTA Forum Journal* 18, nos. 1–2 (2008): 8–23, and revised and reprinted in this volume.

FIGURE 10.4 The Temptation of Christ, Les très riches heures du Duc de Berry (1411–16) (Musée Condé, Chantilly, MS 65 fol. 161v)
WIKIMEDIA COMMONS

indicating a celestial motion.[22] The angel's design involved weight-driven rotational movement: a system of ropes and pulleys with weights, which are

22 See Carl Barnes, *The Portfolio of Villard de Honnecourt* (London, 2016), 158–59; Roland Bechmann, "Villard de Honnecourt," *Apollo* 129 (1989), 300; Jean Wirth, *Villard de Honnecourt: architecte du XIIIe siècle* (Geneva, 2015), 158–61. For further analysis of the function of Villard's angel as a turning-device: Biebel, "The 'Angelot' of Jean Barbet," 340–41; Truitt, *Medieval Robots*, 119.

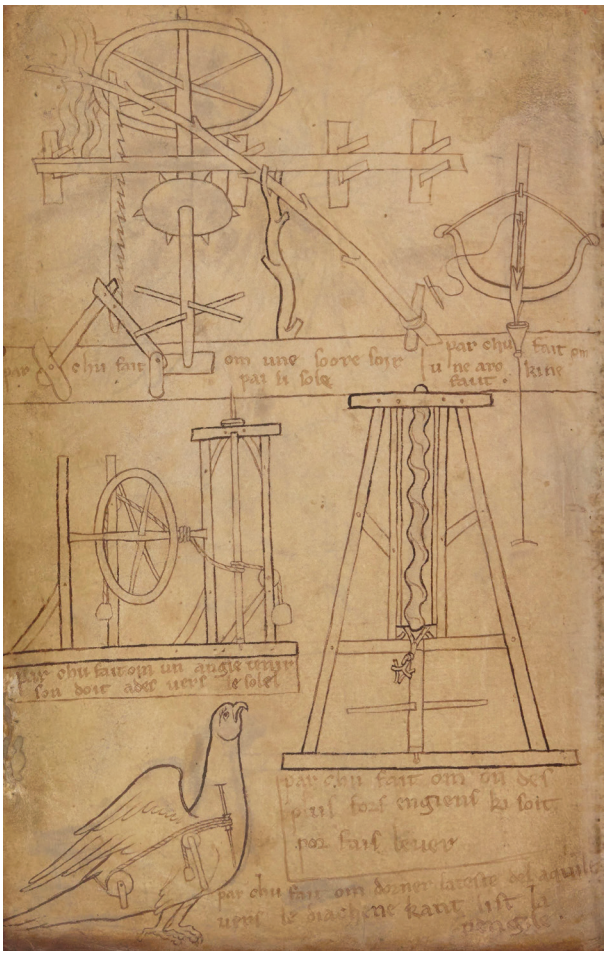

FIGURE 10.5 Portfolio of Villard de Honnecourt, fol. 22v: Angel Turning-Device (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

in turn wound around a wheel, an axle, and a vertical spindle supporting a statue of an angel.[23] Theoretically, the descent of the heavier weight would theoretically rotate the spindle and the horizontal axis, causing the statue to perform a single revolution in 24 hours. In practice, this wouldn't have worked, so Villard may have incompletely recorded an existing machine, as

23 Truitt, *Medieval Robots*, 119–20, noting that the representation of natural process recalled Hellenistic, Byzantine, and 'Abbasid automata.

at Le Dorat; or may have invented this one either himself or with colleagues. Whatever the case, his turning-angel seems to mark a moment in the process of working toward a truly mechanical time-keeper such as the Wells clock. In so doing it situates an angel machine in a setting distinctly suitable for uniting the movements of the liturgy and the spheres, as manifested in the later Burgundian examples with implicit commentary on their rulership.

3 Courtly Ceremony

Eyewitness accounts from the later 1300s into the 1500s attest the courtly deployment of angel machines for coronations, processions, and other forms of pageantry across Western Europe. As intimated by the Archangel Gabriel weathervane in Venice, the analogy of the heavenly and earthly courts was a familiar conceit attested in countless monumental and small-scale images including the vestment of the Archangel Michael in the imperial *loros* in a 12th-century Byzantine enamel set into the Pala d'Oro of S. Marco.[24] Angel machines in courtly contexts broadcast the assertion of divinely sanctioned rulership and implemented an ethos of courtly Magnificence. Royalty and nobility demonstrated this ethos through artistic patronage, joining the Aristotelian and Vitruvian ethical tradition with a sacral element that became especially pronounced with the reigns of Louis IX of France (d. 1270) and Henry III of England (d. 1272).[25] Among the treatises propounding such ideals, all of which were addressed to individual rulers, were *Li Livres dou Tresor* by Bruno Latini (*c*.1260–66), *De regno ad regem Chypri* by Aquinas (*c*.1267), *De regimine principum* by Gerald of Rome (*c*.1280), the *Opusculum de rebus gestis* by Galvano Fiamma, and *Livre des fais et bonnes meurs du sage roy Charles V* by Christine de Pizan (1403).

An early and delightful dispatch of a courtly angel machine happened in London in 1377, when the Worshipful Company of Goldsmiths wrought what seemed to be an angel automaton to crown the ten-year-old Richard II (d. 1400) in glory on the Great Conduit in Cheapside, located about halfway between the Tower of London and Westminster Abbey.[26] This marvel took place the day

24 See Warren Woodfin, "Celestial and Earthly Hierarchies in the Art of the Byzantine Church," in *The Byzantine World*, ed. Paul Stephenson (London, 2012), 309–19.

25 Lightsey *Manmade Marvels*, 31–32; also Paul Binski, *Becket's Crown: Art and Imagination in Gothic England 1170–1300* (New Haven, 2004) for a "thick description" of sacral kingship.

26 Lightsey *Manmade Marvels*, 48; Anthony Goodman and John Gillespie, *Richard II: The Art of Kingship* (Oxford, 1999), 39–40.

prior to Richard's religious anointing at Westminster and effected a public consecration of the child as king. The Goldsmiths transfigured the urban setting into a version of Paradise by hanging bright cloth over tenements, hiring hosts of musicians dressed as angels, and converting water taps into wine taps.[27] The *Anonimalle Chronicle* explained that the angel stood on the belfry of a wood-and-canvas tower and, when Richard approached, held out a golden crown to "do him comfort":

> Set up in the middle of the Cheap stood a tower of painted canvas, curiously constructed, over timber support-beams; about the tower were four turrets, in which stood four damsels, exceedingly lovely and beautifully arrayed, and these said damsels threw gold coins in the direction of the prince's coming. Within the said tower had also been built a small belfry, and on the belfry stood an angel, bearing a golden crown, holding it out towards the said prince, to do him comfort.[28]

Thomas Walsingham, a monk at Saint Albans, remarked further that the angel bent down and reached out to Richard: "[The] golden angel, bearing a golden crown in its hands … was constructed with such ingenuity that, upon the king's coming forth, bending down, it reached out the crown towards him."[29] This worked most likely by means of an interior system of pulleys perhaps germane to a set of "springing" angels intriguingly alluded to in council minutes for a 1442 Corpus Christi procession in Kings Lynn.[30] The angel was an appropriate project for the Goldsmiths inasmuch as their patron saint, Dunstan, had fashioned the coronation crown for Edgar in *c*.960 and thereby sacralized the English coronation ceremony—as well as sublimated the goldsmiths' craft. Dunstan furthermore enjoyed privileged access to angels and angels' song in praise of Christ the merciful ruler, according to the *Golden Legend*: "And [once

27 Lightsey, *Manmade Marvels*, 28, 40. The setting was the Great Conduit in Chepeside, at the intersection of Chepe and Bordhaw Lane at Poultry Street and near the hospital of St. Thomas of Acre. The event was also described in the *Chronica maiora* of Thomas Walsingham—he specified that the castle was built "in the higher part of the marketplace that is called Cheapside."

28 *The Anonimalle Chronicle 1333 to 1381*, ed. V.H. Galbraith (Manchester, 1927/70), 107–08.

29 Walsingham, *Historia Anglicana*, vol. 1, ed. H.T. Riley (London, 1864), 332. "In summitate castelli, quae ad modum tali inter quatuor turres elevate fuerat, positus erat angelus aureus, tenens auream coronam in minibus, qui tali engenio factus fuerat, ut adventati Regi coronam porrigeret inclinando."

30 Michael Rimmer, *The Angel Roofs of East Anglia* (Cambridge, 2015), 19, citing Lynn Borough Archives, KL/C7/3, fol. 155v.

when Dunstan] lay in his bed he saw the brightness of heaven, and heard angels singing *Kyrie eleison* after the note of *Kyrie rex splendens*, which was to him a full great comfort."[31] The "comfort" offered by these angels to king and saint seems to have meant spiritual restitution to the celestial niches with their proper angelic cohorts.

Other courtly apparitions of angel machines unified the ethical and sacral elements of ideal kingship to magnify rulers upon momentous and sometimes sensitive events. In 1389, King Charles VI of France (d. 1422) contrived a grand spectacle for the entry of his new queen, Isabelle of Bavaria (d. 1435), into Paris for her coronation at the Cathedral of Notre-Dame. A procession commenced at the royal abbey Saint-Denis, accompanied by singing children in angel costumes. The chronicler Juvenal des Ursins wrote that when Isabel crossed the bridge just to the left of Notre-Dame, a person ("rather light"), dressed as an angel, descended "by means of well-made engines" from one of the towers of Notre-Dame, passed through an opening in blue-and-gold taffeta hangings hung on the bridge, placed a crown on the queen's head, and then "was pulled back up again, as if he had returned of his own accord to heaven."[32] In a like manner, the triumphal procession of the dynastically complicated Charles I of Spain (d. 1558) into Barcelona—destined for the cathedral—met a "Heaven" machine built above their point of entry to the city at the Gate of Saint Anthony. It apparently resembled the heavenly apparitions which proliferated for contemporaneous paraliturgical spectacles (described in detail below), involving a tall structure in which "there were three wheels and in the middle of the upper one was God, to his right the Virgin Mary, to his left Saint John." On both the second and third, "There were six angels playing stringed instruments, three dressed in white albs, three with albs and red dalmatics belonging to the city, and all wearing angels' masks and wings."[33] The doors and the back of the heaven were painted with stars and cherubim, and once the king

31 Lightsey *Manmade Marvels*, 49. St. Dunstan was portrayed in the company of an angel-harpist in a marginal image decorating MS BL Royal 10 E.IV, fol. 250r of *c*.1300–40: http://www.bl.uk/manuscripts/FullDisplay.aspx?ref=Royal_MS_10_e_iv.

32 "Et y avoit un homme, assez leger, habite en guise d'un ange, lequel par engins bien faits, vint des tours Notre-Dame a Paris a l'endroit dudit pont, et entra par une fente de ladite couverture, a l'heure que la reyne passoit, et lui mit une belle couronne sur la teste. Et puis, par les habillemens qui estoient fais, fut retire par ladite fente, comme s'il s'en fut de soy-mesmes au ciel." Jean Juvenal des Ursins, *Histoire de Charles VI* (Paris, 1614), 365–66. See also Johan Huizinga, *The Waning of the Middle Ages* (Garden City, NY, 1954), 257–58; Truitt, *Medieval Robots*, 136–37.

33 Peter Meredith and John Tailby, *The Staging of Religious Drama in Europe in the Later Middle Ages* (Kalamazoo, 1983), 94, citing M. Mila y Fontanals, "Origenes del teatro catalan," in *Obras Completas*, vol. 6 (Madrid, 1888–96), 251.

was about to reach the Cross by the Gate, "the machine attached to the beam began to descend with four singers in it dressed as angels … and they began to sing." This reconstruction of the celestial court's ordered worship must have provided a measure of comfort to the earthly one striving for justification.

4 Liturgical Performance

Representations of angels proliferated in Gothic churches to manifest the angels' concelebration of the liturgy in concert with human beings. The liturgy included the Mass (whose basic elements were the introductory and concluding rites, the Liturgy of the Word, and the Liturgy of the Eucharist), the seven sacraments (the outward signs of divine grace that Christ had instituted in Scripture: the Eucharist as well as baptism, confirmation, penance, anointing of the sick, marriage, and the taking of holy orders), and the Divine Office sung by religious orders. The angels' mediation of all seven sacraments is illustrated in Rogier van der Weyden's *Seven Sacraments* altarpiece (Figure 10.6). The hymns of the Mass and Office collectively echoed angels' song, but those specifically "seized from the mouths of angels" were the *Gloria in excelsis* exclaimed at Christ's Nativity by "a multitude of the heavenly host" in Luke 2:13–14; and the *Sanctus* cried out by the seraphim stationed above the Lord's throne in Isaiah 6:3, and endlessly by the hybrid seraphic/cherubic "living creatures" of Revelation 4:6–8.[34] Angel bands flocked in all types of imagery to perform these hymns—and others exegetically derived from them—with the human faithful, such as the ones congregated in the stained-glass windows (1447–*c*.1449) of the Beauchamp Chapel of Saint Mary's, Warwick, who hold scrolls, sing hymns, and play musical instruments with palpable joy (Figure 10.7, illustrating the *Gloria in excelsis*).[35] Angel machines dramatized the particular moments at which angels physically emerged within the space of

34 Other passages pertaining to angels' song are the sound of the cherubim's wings in Ezekiel 1:25–25, 3:12–13, and 10:5; the multitudes of angels ministering to the Ancient of Days in Daniel 7:10; the Psalms of Praise; the iterative praises performed by angels and saints in the Book of Revelation opened the door to the exegetical comingling of angels' song with the Psalms of Praise, and generated many more hymns for, e.g., versions of the *Alleluia* sung in acclamation of the Gospel, or for the feast days of saints. See Hammerstein *Die Musik der Engel*, 17–23.

35 The angels' chants include the *Gloria in excelsis*, the *Gaudeamus omnes in domino* (for the Assumption of Mary), and fragments of the Marian antiphon *Ave regina caelorum*. Alexandra Buckle, "'Fit for a King': Music and Iconography in Richard Beauchamp's Chantry Chapel," *Early Music* 38, no. 1 (2010): 3–19.

FIGURE 10.6 Rogier van der Weyden, triptych of the Seven Sacraments, 1440–45 (Royal Museum of Fine Arts, Antwerp)
PHOTO: LUKAS—ART IN FLANDERS

the church: at the Mass serially throughout the liturgical year, and at baptism uniquely for each individual.

4.1 *The Mass*

The Mass incorporated several episodes of human–angelic interaction, with mounting degrees of unity in grace. Choirs of angels and human beings, in parallel with one another, hymned the *Gloria* during the introductory rites (on Sundays and feast days, Lent excepted) and the *Sanctus* shortly prior to the consecration of the Eucharistic gifts as the real body and blood of Christ, in a "high and delectable voice, since the declamations of angels are represented."[36] The act of consecration then engendered the angels' physical entrance into the church. Pope Gregory I had written paradigmatically:

36 The quote is by the prelate Sicard of Cremona (d. 1215), *Mitrale*, III.6, *PL* 213, 122–23; Durandus (d. 1296) reiterated Sicard's prescription in his *Rationale* IV, 66.

FIGURE 10.7 John Prudde of Westminster, Gloria in Excelsis angels (detail of east window), Beauchamp Chapel, Saint Mary's Church, Warwick (*c*.1463)
WIKIMEDIA COMMONS

> In the very hour of the sacrifice, at the words of the priest, the heavens [are] opened and the choirs of angels are present in the mystery of Jesus Christ … and earthly [things] joined to heavenly, and one thing is made visible and invisible.[37]

Following consecration, moreover, the priest pronounced the *Supplices* prayer that an angel of God would come into the sanctuary and deliver the bread to the heavenly altar: "Supplices te rogamus, omnipotens Deus, iube haec perferri per manus angeli tui in sublime altare tuum."[38]

During the Mass, angel machines were deployed in quite literal terms to open the doors of heaven and reveal "the choirs of angels … present in the mystery of Jesus Christ" from the *Sanctus* up through the rite of consecration. Two wooden altar angels of *c*.1520–25 bear candlesticks in one arm, in accord with the Roman Missal's prescription that special candles should burn from

37 Gregory the Great, *Dialogues* IV, 58, qtd. in Peterson, *Angels in the Liturgy*, 49.

38 "Humbly we beseech you, almighty God: command that these gifts to be brought by the hands of your holy angel to your altar on high." Peterson, *Angels in the Liturgy*, 33.

FIGURE 10.8 Candle-bearing altar angels, *c.*1520–25. Source: Johannes Tripps, "Der Kirchenraum als Handlungsort für Bildwerke," in Nicolas Bock et al., eds., *Kunst und Liturgie im Mittelalter* (Munich, 2000), 238, figs. 3, 4

the singing of the *Sanctus* until the end of communion. Their other arm conceal bell-ringing mechanisms presumably to signal the transubstantiation of the gifts (Figure 10.8).[39] Pyx-bearing angels waited in the vaults of the cathedrals of Paris, Angers, and Rouen until they descended by cords to deliver the Host to the celebrant.[40]

39 For the candle-bearing angels: Johannes Tripps, "Der Kirchenraum als Handlungsort für Bildwerke," in Nicolas Bock et al., eds., *Kunst und Liturgie im Mittelalter* (Munich, 2000), 238–39; Frank Matthias Kammel, "Ein Engel 'von der Stange': zu Gestalt und Funktion eines spatgotischen Stableuchters," *Monatsanzeiger des Germanischen Nationalmuseums Nurnberg* 217 (1999): 4–5; Gottfried Biedermann, *Alte Galerie am Landesmuseum Joanneum: Katalog der mittelalterlichen Kunst, Tafelwerke—Schreinaltaere—Skulpturen* (Graz, 1982), cat. nos. 180–81, inv. no. P.93 and P.94. Also Tripps, "The Priest Assisted by Automatons: Altars and Altarpieces with Mechanical Figures," in *Die Macht der Dinge: Symbolische Kommunikation und kulturelles Handeln*, ed. Andreas Hartman et al. (Munster, 2011), 344, citing: Gottfried Biedermann, *Alte Galerie im Landesmuseum Joanneum, Katalog der mittelalterichen Kunst* (Graz, 1982), cat. nos. 180 and 181 (inv. nos. P.93 and P.94), 284ff.

40 Tripps, "Der Kirchenraum als Handlungsort für Bildwerke," 238 (and ibid., "The Priest Assisted by Automatons," 340), citing: Otto Nussbaum, *Die Aufbewahrung der Eucharistie im Mittelalter* (Bonn, 1979), 340, 343.

Sometimes, entire choirs of mechanized angels intervened in the Eucharistic Liturgy. The remodeling of Siena Cathedral's choir from 1375 featured a baldachin over the high altar incorporating three little angels—carved by the goldsmith Piero d'Angelo and painted by Lippo Vanni—who, on solemn Masses and feast days, would "float" in succession down to the high altar to give the celebrant the host, pyx, and corporal (the cloth for covering the gifts).[41] These angels were joined by four candle-bearing ones, suspended from the vault, who illuminated Duccio's *Maestà.* Dozens more candle-bearing angels surmounted the choir-stalls (completed in 1386). Similarly, in 1502, the bequest of an English alderman named Thomas Goisman provided for multiple angels to drop from the chancel ceiling of Trinity Chapel, Hull, where he would be buried. Goisman's angel machine would imitate that already installed in the chancel of Kings Lynn Saint Margaret, where angels descended from the roof to the high altar for the miracle of transubstantiation, between the *Sanctus* and the *Pater noster*:

> October 20, 1502. Thomas Goisman, alderman of Villa Begia above Hull. [My grave shall be] in Trinity Chapel, in the northern part, between my father and mother, before [the altar of] St. Katherine. [For this chapel] I leave 10 pounds, in honor of the Sacrament, for making at the high altar [a device featuring angels that] descend and ascend to the roof of the chapel between the elevation of the body and blood of Christ, as it is done in Lynn Cathedral; that is, with angels it ascends and descends at the end of the chanting, and "Lead us not into temptation."[42]

41 Taddeo di Francesco, 1412: 9 lire "per uno angnolo del legname el quale si pose in sagrestia," qtd. in Tripps, "Der Kirchenraum als Handlungsort für Bildwerke," 239. N.B. Relatively economic versions of such angel figures survive, e.g., 14 paper angels mounted on card dating between *c.*1425–50, found in the Cagnola Collection in Gazzada, the Museo Stibbert in Florence, and in the Palazzo Venezia in Rome: see Tripps, "The Priest Assisted by Automatons," 339–40.

42 "Oct. 20, 1502. Thomas Goisman, aldermannus de Villa Begia super Hull. Sep. in capella S. Trin., parte boriali, juxta meum patrem et matrem, coram S. Virgine Katerina. Lego eidem capellae xli., in honore Sacramenti, ad faciendum ad summum altare descendent et ascendent (sic) ad tectum capellae inter levationem corporis Christi et sanguinis Domini, sicut est apud Lynne in eccL cath. [= St. Margaret's]; scilicet angelis ascendetur et descendetur usque ad finem cantationis, et Ne nos inducas in temptationem. Resid. Alicise uxori meae." Will #102 of Thomas Goisman of Kingston upon Hull, in *Testamenta eboracensia: A Selection of Wills from the Registry at York*, vol. 4 (London, 1869). Also see Miri Rubin, *Corpus Christi: The Eucharist in Late Medieval Culture* (Cambridge, 1991), 62; and for more about automata, Margaret Aston, *Faith and Fire: Popular and Unpopular Religion, 1350–1600* (London, 1993).

4.2 *Baptism*

Christ's statement "Amen, amen, I say to you, no one can enter the kingdom of God without being born of water and Spirit" (John 3:5) affirmed that the sin-cleansing sacrament of baptism was requisite for salvation and, as such, another occasion of angelic happiness (cf. Luke 15:10: "Likewise, I say unto you, there is joy in the presence of the angels of God over one sinner that repents"). Angels helped to effect the consecration of the baptismal water as consubstantial with the Holy Spirit, as a typological reading of the angel-stirred healing pool in Jerusalem (John 5:4), and attended the baptismal rite as witnesses.[43] According to the Church Father Tertullian: "An accession *of efficacy* was granted to the waters and to the angel … In the water, under [the witness of] the angel, we are cleansed, and prepared *for* the Holy Spirit."[44] The Sarum Use prayer for the catechumenal rite leading up to baptism explicitly invoked a guardian angel, in a way echoing the *Supplices* of the Mass: "We beseech you, Lord, that you would vouchsafe to send your Holy Angel from heaven, that he may likewise guide this servant and lead her to the grace of your baptism."[45]

It is no surprise, then, that figures of angels often decorated baptismal ensembles: on fonts, canopies, and the lifting-systems deployed to raise and lower the font-covers that protected the holy water. The spire-shaped, counterpoised font-cover in the nave of the Saint Mary parish church in Ewelme (Oxfordshire) is hung from a roof-beam by a cable attached to its pinnacle, which in this case is a carved figure of Saint Michael the Archangel (whose connection with baptism concerned his role as a conqueror of devils, per the prebaptism exorcism rite) (Figure 10.9).[46] Perhaps even more demonstrative is an angel pulley guide (*c*.1470–80) on a roofbeam in the middle of the nave of the Saint John the Baptist parish church in Aldenham (Hertforshire), who is ever ready to lift the lid of the baptismal font below (Figure 10.10).[47] This angel

43 The most ancient reference is in Tertullian's treatise on Baptism: *medicatis quodammodo aquis per angeli interventum*, and in chapter 6 where he argued: *in aqua emundati sub angelo Spiritui Sancto praeparamur*, and further on: *angelus baptismi arbiter superventuro Spiritui Sancto vias dirigit abolitione delictorum*. The angel who stirred the holy waters was normally identified as Raphael: Laura Sangha, *Angels and Belief in England 1480–1700* (London, 2015), 26.

44 Tertullian, *On Baptism*, v–vi.

45 J.D.C. Fisher, *Baptism in the Medieval West* (London, 1965), 181.

46 Francis Bond, *Fonts and Font Covers* (London, 1908), 298. The cover's balance weight is a Tudor rose, a device that once again related the royal and angelic courts (again appropriate, given Saint Michael's position as prince of angels).

47 For the image: http://www.british-history.ac.uk/vch/herts/vol2/pp149–161.

FIGURE 10.9 Baptismal font canopy, Saint Mary parish church, Ewelme, Oxfordshire (15th century)
WIKIMEDIA COMMONS

would not only reveal the angel-stirred holy water and concretize the guardian angel about to attach itself to the newly baptized, but also highlight the role of baptism in attaining to Paradise due to its position amidst flocks of angels with shields perching amidst red roses on the tie-beams, whose arched struts rest on stone angels who also hold shields and promises of future bliss.

4.3 *Feast Days*

Angel machines could also apparate for appropriate feast days. At Norwich Cathedral at the turn of the 15th century, a bull of papal indulgence enticed penitents to visit the cathedral's three main altars during the Feast of the Holy Trinity (the Sunday after Pentecost). The 1401 ceremony introduced a carved and brilliantly decorated angel who—operated by a pulley system—would descend from the nave roof with a great censer, censing the rood and the

FIGURE 10.10 Angel pulley guide for the baptismal font canopy, Saint John the Baptist parish church, Aldenham (15th century)
PHOTO: SARAH BLICK

"doubtless vast congregation in the nave."[48] The sacrists' rolls list recurring charges for brightening the angel with foil year by year, and to pay someone to lower and raise it on Trinity Sunday and soon also Corpus Christi (the Thursday after Trinity Sunday, celebrating Christ's real presence in the Eucharist).[49] The angel's deployment for these particular feasts suggest that it made its entry at or near consecration to democratize the angels' emergence into the church for this mystery (whereas the machines at Siena, Kings Lynn, and Hull operated

48 This special feature was introduced when an indulgence at the Trinity dedication festival came into operation, and later was also enacted at the feast of Corpus Christi. See Very Rev. W. Lefroy, *Norwich Cathedral* (London, 1897), 45–46.

49 William Page, *The Victoria History of the County of Norfolk*, vol. 2 (London, 1906), 322; Ian Atherton et al., *Norwich Cathedral: Church, City, and Diocese* (London, 1996), 405.

within the sanctuary). Underscoring the sanctifying liminality of angels as well as church spaces, Bishop Lyhart (1446–72) vaulted the previously flat timber ceiling of the nave and provided the angel apparatus with a very visible two-foot-wide hole in the middle bay.[50]

The most important non-Christological feast of the liturgical calendar is the Assumption of the Virgin Mary on 15 August, celebrating the occasion on which she was taken body and soul into heaven as a reward for her extraordinary contribution to human salvation. Upon arrival Christ crowned her as queen, to rule alongside him. It is the principal feast of the Marian calendar with a long history of reenactments starring animated images of Mary, Christ, and the angels.[51] One spectacle was performed at the small Herrgottskirche in Creglingen, Germany, within Tilman Riemenschneider's great pine- and lime-wood winged altarpiece of the Assumption (*c*.1506) (Figure 10.11).[52] This altarpiece's external structure—which resembles a Late Gothic monstrance writ large—opens to reveal a central scene of the Virgin in a mandorla fashioned from angels, attended by the 12 awe-stricken Apostles. Above are a scene of the Coronation as well as a Resurrected Christ at the pinnacle. The archaeologist Friedrich Hertlein wrote in 1903: "In the upper representation of the Coronation the two small floating angels holding the crown were made with moveable parts; until a few years ago, they were suspended on gut strings, and thus could be pulled up and down; there is no doubt that on the feast-day of the Assumption of Mary, the Coronation of Mary would have been enacted before the assembled devotees."[53]

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50 Page, *The Victoria History of the County of Norfolk*, 322; Rimmer, *The Angel Roofs of East Anglia*, 19. Expenses of 1369 included £2 6*s*. 7*d*. for gilding two archangels at the high altar. At Easter, 1487, Henry VII was present at Norwich, and in his honor the pageant occurred a third time that year (in addition to Corpus Christi and Trinity).

51 The prototype for such ceremonies seems to have been the one in Rome: the pope, clergy, and civic representatives staged the encounter between Christ and Mary by processing a miracle-working of Christ from its home at the Lateran to S. Maria Maggiore, to meet the ancient and also miraculous *Madonna and Child* icon (attributed St. Luke) at S. Maria Maggiore. See Hans Belting, *Likeness and Presence* (Chicago, 1994), 68 (describing an event of 1170).

52 The contract for Creglingen does not survive, but another of 15 April 1501 between Riemenschneider and delegates of the City Council of Rothenburg stated that, in the *Auszug* above the main *Corpus* of the Altarpiece of the Holy Blood in St. Jakobskirche, "[Riemenschneider] shall carve in the middle two Angels kneeling opposite each other and holding the Holy Cross, and also above the Cross two gliding Angels, all of the size demanded according to the drawing." Translated in Michael Baxandall, *The Limewood Sculptors of Renaissance Germany, 1475–1525* (New Haven, 1980), 172–74.

53 Friedrich Hertlein, "Vom Marienaltar in der Creglinger Herrgottskirche," in *Württembergisch Franken*, n.s. 8 (1903), 124. Qtd. in "The Mechanical Presentations of Marian Statues

FIGURE 10.11 Tilman Riemenschneider, Altarpiece of Saint Mary, Herrgottskirche, Creglingen am Tauber (*c.*1505–10). (Wikimedia Commons).

4.4 *Paraliturgical*

The most spectacular of angel machines seem to have been constructed for the paraliturgical performances put on by lay organizations across Gothic Europe, for the same events so amplified in liturgical contexts.[54] Many of these involved an angel-intensive "Heaven machine" fashioned as a rotating domed superstructure, suspended from a high part of a church or from a float

in the Late Gothic Period," trans. Patricia Smith (Lecture transcript, 47th International Congress on Medieval Studies. Kalamazoo, 2012), 8–9.

54 See especially Karl Young, *The Drama of the Medieval Church*, 2 vols. (Oxford, 1933); Meredith and Tailby, *The Staging of Religious Drama*; and Wilson, "If Monuments Could Sing."

or other purpose-built edifice.[55] Holy figures could be transported to and from the Heaven by "clouds" of wood and iron that were operated by pulleys and winches or by cranes.[56] The clouds tended to be covered in cotton-wool and feature alarming pyrotechnic displays. Another common accessory of Heaven machines was a chandelier-like glory, or *stella*, of suspended angels. The angels who populated each component were typically a mix of images made of wood, leather, or paper, and living actors.

For instance, the Doomsday pageant wagon of the York Mercers' Company configured the throne of God, as presented in the Book of Revelation, as a dynamic tableau (according to an inventory of parts dated 1433). The wagon, in brief, featured a multitiered Heaven adorned with a rainbow, blue and red clouds, golden stars and sunbeams, a cloud to transport the actor who played God, seven great angel images and four smaller gilt ones (all holding emblems of Christ's Passion), and nine small red-painted angels that could be pulled by a cord to "run about" the circuit of heaven:

> ij paire aungell wynges, with *iren in the ends*; ij trumpes of *white plate* and ij *redes*; … a cloud and ij peces of rainbow of *tymber*; array for god (that is to say a sirke wounded, a diademe with a veserne gilted); … iiij *irens to bere uppe heven*; iiij smale coterelles and a *iren pynne*; a *brandreth of iren* that God sall sitte uppon when he sall sty uppe to heven, with iiij *rapes* at iiij corners; a heven *of iren*; ij peces of rede cloudes and sternes of gold, langing to heven; ij peces of blu cloudes *payntid on bothe sydes*; iij peces of *rede cloudes with sunne-bemes of golde and sternes*; for the hiest of heven …; vij grete aungels, halding the passion of god (ane of thame has a fane of laton and a crosse of iren in his hede, giltid); iiij smaller aungels, giltid, holding the passion; ix smaller aungels *payntid* rede, to renne about in the heven; a lang small corde, to gerre the aungels renne aboute.[57]

55 Anonymous, *Annunciation Play*, *c*.1495–1500. Florence, Biblioteca Nazionale Centrale. For this woodcut and the *festa* that it illustrates, see Alessandria Bucchieri, *The Heaven Machine in Florentine Theatrical Tradition*, digital exhibition: https://www.artes-exhibition.digital/the-heaven-machinery/.

56 On the authority of Buccheri in *The Spectacle of Clouds* (London, 2017), the first known documentation of cloud machinery dates from 1399, in Zaragoza: see "The Staging of the Assumption in Europe," *Comparative Drama* 25, no. 1 (1991): 17–29. It is possible that cloud machinery was in use prior to this date (as it was in the theater of ancient Athens for a satirical Socrates to ride around in, "in Aristophanes, *The Clouds*," produced originally in 423 BCE): Vincenzo de Bartholomaeis, *Laude drammatiche e rappresentazioni sacre*, 2 vols. (Florence, 1943), 1:xi-iii.

57 Qtd. in Meredith and Tailby, *The Staging of Religious Drama*, 92.

Perhaps the best-documented spectacles were those produced by *laudesi* companies in Florence, Italy. These were groups of laymen (and sometimes women), organized under mendicant orders, whose characteristic devotion was to sing vernacular hymns accompanied by musical instruments, e.g., pipes, drums, bells, trumpets, and *organetti*. Members expressed their conviction that they sang their *laude* (vernacular hymns) with the celestial choirs in images of angels playing these very instruments. Examples include the "super icon," organ shutters, and stained-glass windows of Orsanmichele; and miniatures accompanying several *laude* in the *laudario* of the confraternity of Santa Maria delle Laudi e di Sant'Agnese based in S. Maria del Carmine (begun 1268, consecrated 1422), e.g., for the Ascension of Christ (Figure 10.12).[58]

Neri di Bicci, a painter and procurator of the lay Sant'Agnese company, recorded the "fittings and furnishings of a *Stella* that is placed in [S. Maria del Carmine] many times a year on feast days" in an inventory of 1467.[59] This *stella* was large, had wooden spokes, and could be raised and lowered from a comprehensive "Heaven machine" above the *ponte* (a substantial structure separating the choir and nave) by "a big rope with a wooden hook." From the spokes hung: 22 framed panels with the company's insignia; 22 little clouds (*Nugolette*); 23 cherubim and 23 seraphim; and 24 large *pâpier-maché* angels, brightly painted and gilded. Tripps has observed that the appearance of glories of angels seems to be recorded in Domenico di Bartolo's fresco (1441) of the *Distribution of Alms* in the Ospedale di Santa Maria della Scala, Siena: dancing, candle-bearing angels hang on a rotating wheel next to an organ gallery, below which is an altar with a baldachin (Figure 10.13).[60] Such glories of angels seem to reify a remark by Saint Bonaventure—delivered in a sermon, not an academic treatise—which highlighted the relation of angels' praise with the music and motions of the spheres:

> The glory of heaven is that it has the most loving company, because the blessed always dance a round dance filled with all pleasantness

58 For Orsanmichele: Blake Wilson, "If Monuments Could Sing: Image, Song, and Civic Devotion inside Orsanmichele," in *Orsanmichele and the History and Preservation of the Civic Monument*, ed. Carl Strehlke (Washington, D.C., 2012), 141–68. For Sant'Agnese: Christine Sciacca, ed., *Florence at the Dawn of the Renaissance*, exh. cat. (Los Angeles, 2012), cat. no. 45.12, 257–60.

59 Nerida Newbigin, *Feste d'Oltrarno*, vol. 1 (Florence, 1996), 71–72; also see Blake Wilson, *Music and Merchants: The Laudesi Companies of Republican Florence* (Oxford, 1992), 90.

60 Glories of angels also appeared in churches, e.g., Orvieto Cathedral. See Tripps 2011, 343–44.

FIGURE 10.12 Pacino di Bonaguida, "The Ascension of Christ," Laudario of Saint Agnese (*c.*1340)
PHOTO: J. PAUL GETTY MUSEUM

> in the company of God. Thus note that you should devoutly consider three things about that dance of heaven: the innumerable assembly, the interminable circuit, and the inestimable song.[61]

Though their *stella* featured throughout the festal calendar, the Sant'Agnese company was best known for their remarkable Ascension *festa*, staged inside the Carmine from at least the 1390s until 1497.[62] Newbigin has reconstructed the essential setup of the 15th-century *festa* by synthesizing the accounts

61 *De gloria paradisi*, qtd. in Hammerstein, *Die Musik der Engel*, 28.

62 Newbigin, *Feste d'Oltrarno*, 1: 45–52. For a reconstruction by Luciano Ministrella: https://lacittaimmaginaria.com/i-racconti-meccanici-di-luciano-minestrella/; for one by Cesare

FIGURE 10.13 Domenico di Bartolo, *Distribution of Alms*, Ospedale di Santa Maria della Scala, Siena (*c.*1440–1444).
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of Paolo di Matteo Pietribuoni (1422), the Russian bishop Abraham of Souzdal (1439), Neri di Bicci (a painter and procurator of the confraternity, in an inventory of 1467), and Giorgio Vasari (1568). The action unfolded between the massive wall-to-wall *ponte* and Heaven machine above (Figure 10.14).

On the *ponte*, the 11 Apostles with the Virgin Mary and Mary Magdalene proceeded from Jerusalem (a wooden castle, painted to resemble stone) to meet Christ at the Mount of Olives (similarly constructed). Christ gave the pontifical keys to Peter, climbed up the mountain, and bade the assembly farewell. Now Heaven came into play: Abraham observed a wooden platform with a circular opening (the "Portal of Heaven"), "covered by a blue curtain decorated with

Lisi: Mario Fabbri, *Il luogo teatri a Firenze: Brunelleschi, Vasari, Buontalenti, Parigi*, exh. cat. (Milan, 1975).

FIGURE 10.14 Reconstruction of the S. Agnese Ascension festa, S. Maria del Carmine. IMAGE FROM PHILIP STEADMAN, "A THEATRE OF MACHINES," IN *RENAISSANCE FUN: THE MACHINES BEHIND THE SCENES* (LONDON, 2021), FIG. 2.1, P. 73

a sun, the moon, and stars to represent the first Celestial sphere," and whose rim "was adorned with effigy images of angels painted on discs by skillful artists. These turned and moved separately, the one from the other."[63] As Christ prepared to ascend, "a rumble of thunder was heard, the sky opened, and the Celestial Father was revealed suspended in mid-air in a miraculous manner, enveloped in a dazzling light created by infinite little lamps [and] harmonious music and sweet singing was heard in the distance. The wondrous angel-images

63 Qtd. in Orville K. Larson, "Bishop Abraham Souzdal's Description of *Sacre Rappresentazioni*," *Educational Theatre Journal* 9, no. 3 (1957): 211–12.

painted on the discs moved and turned in such a manner as to appear life-like."[64] Winched by cables on the *ponte*, a *nugola* (cloud) descended, with an attached *sesta* bearing two angels, to take up Christ.[65] They were engulfed in a blaze of light and accompanied by music until they reached Heaven; then the church grew dark and quiet. As for the *accoutrements* of Heaven, Neri di Bicci listed "twelve parchment planets on circular wooden frames which are attached … below the Angels," and "a throne around God the Father, made of wood, with paper planets."[66]

And the Ascension *festa*'s cosmic jubilation (thunderous and sweet alike), as well as its attention to Christ's passage in angelic company through the cosmic spheres, reified the *Golden Legend*'s exegesis of the brief biblical accounts of this event (especially Luke 24:50–52 and Acts 1:9–11):

> [Christ ascended] joyfully, because the angels were jubilant, whence Ps. 46:6 (47:5) says: "God ascended with Jubilee." Augustine: "As Christ ascends, the whole heaven quakes, the stars marvel, the heavenly hosts applaud, trumpets sound and blend their dulcet harmonies with the joyous choirs." (…) He must have ascended with great speed, as it were in a moment. Rabbi Moses [Maimonides], the great philosopher, tells us that each orbit or heaven of any of the planets is 500 years across … Therefore, since there are seven heavens, from the center of the earth to the vault of the heaven of Saturn … there will be, according to Rabbi Moses, a journey that would take 7,000 years, and to the dome of the empyrean [heaven], 7,700 … So it was a great leap that Christ made from earth to heaven. [And] let it be known that Christ ascended with … a great multitude of angels.[67]

64 Ibid.

65 Buonaccorso Ghiberti's (1451–1516) drawing (*c.*1470) of the Zibaldone used in Siena for the Feast of the Assumption shows that the mandorla was raised and lowered with a system of ropes and pulleys (and that the angels were secured with belts to the brackets). Ghiberti drew and described the complex of lights, in similar terms to the way in which Vasari described those in a machine made by Filippo Brunelleschi: "A mandorla of copper, hollow within, wherein were many holes showing certain little lamps fixed on iron bars in the form of tubes; which lamps, on the touching of a spring, which could be pressed down, were all hidden within the mandorla of copper, whereas, when the spring was not pressed down, all the lamps could be seen alight through some holes therein." Qtd. in Bucchieri, *The Spectacle of Clouds*, 17.

66 Ibid., 75.

67 *The Golden Legend* 2012, 293.

5 Conclusion

Representations of angels in Gothic art were both indices of belief and active forces of engagement. Angel machines—within their holistic built and performative settings—were a late but consummate expression of applied angelology commissioned by courts, churchmen, and lay individuals and corporations; and designed and assembled by architects, carpenters, sculptors, metalsmiths, and painters. They vividly manifested angels' functions as mediators between the celestial and sublunary, governors of the cosmos, magnificent residents of the heavenly court, assistants in the sacraments, and leaders of the jubilant praise of God. Their effect was to stir comfort, joy, and awe, precipitating the actions and attitudes of the mystical and ultimately physical union of human beings and angels. Together with representations of angels in works of art (fixed and portable, monumental and precious), song, and human performers, the machines formed an angelic multiplicity that emanated the promise of Hebrews 12: "You are to come unto the Heavenly Jerusalem, and to an innumerable company of angels."

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CHAPTER 11

ReCOGnition: Revisiting Medieval Gearing from Vitruvius to Print

Steven A. Walton

Gears are synonymous with 'technology' in the modern world, visually at least, but that has not always been the case. Today we both "recognize" them—the intellectual awareness from the Latin *cognoscere*, 'to know'—but we also re-COGnize them: a rather clumsy coinage for understanding them as fundamentally important elements of technology, at least predigital technology. Gears are quite literally and figuratively, critical cogs of modern mechanical machinery. It is important, however, to recognize that machinery before the Industrial Revolution was generally of a different type and tended to use gears less freely. Gears in the premodern world were rarer, were apparently considered "merely" a component of an overall machine as will be investigated below, and were consequently not icons of technology.[1] The investigation of medieval gear terminology demonstrates their shift from undifferentiated parts of a machine to, now, a physical *and* symbolic icon of technology.

Geared machinery, especially mills, existed throughout the classical and medieval periods in a number of forms. There were planar fine-toothed gears as found in the Antikythera mechanism, whose uniqueness belies the realization that this gear type was potentially more widely known and there are indications it was not completely unique as a type.[2] There were sprocket gears with linked chains found in pumps and in catapult mechanisms. Pawls ratcheting on gears with asymmetrical ("saw-tooth") teeth might be found in those catapults as well and were known at least in the medieval Arabic world on water-lifting *norias*. The endless screw or worm gear is known to have driven some spur gears in small-scale fine technology, particularly in the medical and

1 Semiotically speaking, it would appear that gears—toothed wheels—were not a *sign* of any sort in the West in Antiquity or the Middle Ages. Today the toothed wheel is a very clear *signifier* (an *icon* in these terms) for the larger *signified* concept of technology (which is itself, after all, modern), see Erc Schatzberg, *Technology: Critical History of a Concept* (Chicago, 2019), ch. 2–4 for the ancient and medieval world.

2 Alexander Jones, *Portable Cosmos: Revealing the Antikythera Mechanism, Scientific Wonder of the Ancient World* (Oxford, 2019) and Jian-Liang Lin and Hong-Sen Yan, *Decoding the Mechanisms of Antikythera Astronomical Device* (Berlin, 2016).

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ophthalmological fields in the Roman world. Finally, large wooden spur gears, consisting of peg-teeth around the circumference of a wheel rim, typically extending laterally in the direction of the axis, but also radially out from it, were used to drive crown, lantern, or spur gears and are described in mills and other large ancient industrial machinery, certainly by the 1st century CE; these are often referred to generally as "power gearing."[3]

It is this last type of gear that Marcus Vitruvius Pollio, the best-known classical author for technical literature, describes in Bk. X of his *De architectura*. Vitruvius is the *urtext* of understanding for the description of powered machinery such as watermills, despite the paucity of information on their actual construction in his text. Earlier texts, such as the pseudo-Aristotelian *Mechanical Problems* (?4th century BCE or later), Athenaeus Mechanicus's *On Machines* (?2nd century BCE), or numerous works on specific technologies (often military machines),[4] speak of machine elements to varying degrees, but often deal only with less productive or "merely entertaining"—yet still quite complex—technologies. Aristotle takes the use of gears for granted as early as the 4th century BCE when he described a windlass that reversed rotation, which necessarily implies the use of gearing; Heron of Alexandria (1st century CE) describes toothed-wheel mechanisms in the *Pneumatica*; and Pappus of the same city (4th century CE) describes worm gearing, whose existence is implicit in Heron as well.[5] To slightly simplify the situation, however, gears are not prominent in the classical written corpus, though we know they were physically there.[6] This

3 Vernard Foley, Werner Soedel, John Turner, and Briand Wilhoite, "The Origin of Gearing," *History of Technology* 7 (1982): 101–30.

4 Serafina Cuomo, *Technology and Culture in Greek and Roman Antiquity* (Cambridge, 2007), esp. ch. 2. See also Michael A. Coxhead, "A Close Examination of the Pseudo-Aristotelian *Mechanical Problems*: The Homology between Mechanics and Poetry as *Technē*," *Studies in History and Philosophy of Science part A* 43, no. 2 (2012): 300–06.

5 M.J.T. Lewis, "Gearing in the Ancient World," *Endeavour*, n.s. 17 (1993): 110–15; Hugh P. Vowles, "Early Evolution of Power Engineering," *Isis* 17, no. 2 (1932): 412–20; Marie Boas, "Hero's Pneumatica: A Study of Its Transmission and Influence," *Isis* 40, no. 1 (1949): 38–48; Lucio Russo, *The Forgotten Revolution: How Science Was Born in 300 BC and Why It Had to Be Reborn* (Berlin, 2004), 97–100.

6 Indeed, the *Mechanical Problems* preamble (though none of the actual problems) speaks of gear trains—"many circles are in opposite motions, such as they have dedicated in temples [in automata, presumably], having made the little wheels (τροχίσκους) out of bronze and steel"—yet abstracts it in terms of the motion of circles (κύκλον) only, so there is little sense of actual mechanical gears in action: "taking this underlying nature of the circle, craftsmen make a machine hiding the cause, so only the marvel of the mechanism is visible while the cause is unseen" (also reinforcing the notion that for the ancients, it was *causes*, not effects, which were of prime interest). Thomas Nelson Winter, "The Mechanical Problems in the Corpus of Aristotle," University of Nebraska–Lincoln, Classics and Religious Studies Department Faculty Publications no. 68. Online at https://digitalcommons.unl.edu/classicsfacpub/68, 2–3.

suggests that although actual survivals are impossibly rare, power and fine gearing was broadly if not ubiquitously known, and likely used, in the Greco-Roman world.[7]

De architectura is the first surviving work to describe large-scale, powered machines, although in most cases without anything like construction descriptions for the layman.[8] We read in the more internalist histories of technology that Vitruvius became known again in Europe by the 12th century (in fact, the work had quite broad survival in manuscripts),[9] along with all the works of Archimedes and the *Mechanica* of pseudo-Aristotle in the following century. Some modern historians of science and military history thus imply that the "medieval industrial revolution" is tied to the so-called Scholastic Revolution of the 12th century, but these same engineering-minded authors assert, "these writings had no influence on the practice of medieval craftsmen who did not understand Latin."[10]

That may well be, but not knowing Latin emphatically does *not* mean that those craftsmen stopped building machines and using the techniques that Vitruvius described—and tersely at that—for geared machinery. Continuity remained at the building yard generation after generation and *ingenarii* moved from town to town and by Royal warrant to spread technologies—and maybe innovations happened, too—but only in an occasional moment did these knowledgeable artisans see any need to set it down on parchment

7 Darle W. Dudley, *The Evolution of the Gear Art* (Washington, D.C., 1969), 5–15.

8 By comparison, some of the ancient Greek specialist technological literature, like that on catapults, is much more explicit on how you build them while Vitruvius is far more superficial in his description. Eric William Marsden, *Greek and Roman Artillery: Technical Treatises* (Oxford, 1971). Pawls, but not gears, are found in this corpus, though one would not expect gears as their continuous rotation is not as relevant for siege machines, and the sorts of accelerations and stresses in torsion artillery would challenge wooden or bronze gears anyway.

9 Carol Herselle Krinsky, "Seventy-Eight Vitruvius Manuscripts," *Journal of the Warburg and Courtauld Institutes* 30 (1967): 36–70.

10 Eberhard Knobloch, "Mathematical Methods in Preindustrial Technology and Machines," in *Technological Concepts and Mathematical Models in the Evolution of Modern Engineering Systems: Controlling, Managing, Organizing*, ed. Mario Lucertini et al., 3–20 (Basel, 2004), 3. The same implication that medieval "science" must have influenced medieval technology is found throughout the otherwise wonderful Peter Purton, *The Medieval Military Engineer* (Woodbridge, 2018), and the same tension continues into the early modern era; on which see Pamela O. Long, *Artisan/Practitioners and the Rise of the New Sciences, 1400–1600* (Corvallis, 2011) and Lesley B. Cormack, Steven A. Walton, and John A. Schuster (eds.), *Mathematical Practitioners and the Transformation of Natural Knowledge in Early Modern Europe* (Cham, 2017).

or paper.[11] More to the point, practitioners' activities only very occasionally became interesting fodder for the learned or for 'scientists' (mathematicians, anyway, and natural philosophers less so). The elite conclusions (as limited as they were) as found in manuscript treatises and later in incunabula almost never in our period percolated 'downwards' into practice. As we shall see, a craftsman would not learn much from Vitruvius anyway. Fine gearing exists in the late Roman world, throughout the Islamic medieval world, and well-developed metal gearing (re?)appeared in Europe no later than the beginning of the 13th century.[12] As for Vitruvian power gearing used in large machines like mills, although the technology does not lend itself to preservation, it is increasingly obvious that water-powered machinery existed throughout Europe and Western Asia from the last century or two before the Common Era, and throughout the second half of the first millennium of the Common Era.[13]

This tension between what writers (failed to) tell us existed in their day and what we now increasingly know *did* exist reveals an important disjunction between modern and premodern thought about technology. This situation is only partially a separation between thinkers and doers, for although it is true that there was no curriculum for mechanical arts in the ancient world, whether the ancient thinkers *cared about* engineering or technology is not at issue.[14] The question is whether they *recognized* gears as the fundamental mechanical components that we do today, and there the evidence is ambiguous: they clearly had them, but they seem not to have been considered as consciously central to technologies as they would later become.[15] The divide between the learned and the practical can also be seen in the modern academic

11 Joseph Rykwert, "On the Oral Transmission of Architectural Theory," *RES: Anthropology and Aesthetics* 3 (1982): 68–81.

12 Judith Veronica Field and M.T. Wright, *Early Gearing: Geared Mechanisms in the Ancient and Medieval World* (London, 1985), idem, "Gears from the Byzantines: A Portable Sundial with Calendrical Gearing," *Annals of Science* 42, no. 2 (1985): 87–138.
See also John G. Landels, *Engineering in the Ancient World* (Berkeley, 1978); John Peter Oleson, *Greek and Roman Mechanical Water-Lifting Devices: The History of a Technology* (Toronto, 1984); Sophia Germanidou, "Watermills in Byzantine Greece (Fifth–Twelfth Centuries). A Preliminary Approach to the Archaeology of Byzantine Hydraulic Milling Technology," *Byzantion* 84 (2014): 185–201 and the extensive literature cited therein.

13 Adam Lucas, *Wind, Water, Work: Ancient and Medieval Milling Technology* (Leiden, 2006).

14 Elspeth Whitney, *Paradise Restored: The Mechanical Arts from Antiquity through the Thirteenth Century*, Transactions of the American Philosophical Society 80, pt. 1 (Philadelphia, 1990).

15 Russo, *Forgotten*, 120–25, 185–87. We can also note how silent the ancient texts early in the Common Era are on watermills, yet that archaeology and epigraphy continue to find them across the whole Roman Empire; Russo, *The Forgotten* Revolution, 255–57 and see Örjan Wikander, *Handbook of Ancient Water Technology* (Leiden, 2000), 401–10.

dismissal of all that came before the 16th century as blind craft, while all that came after as "engineering."[16] That learned/practical divide is worth querying as to how geared machinery was noticed and understood between Vitruvius and Leonardo, or, more precisely, from the composition of *De architectura* in the 1st century CE to its first printings in the 15th[17] and 16th.

A caveat: This investigation makes no claim that Vitruvius wrote a practical building manual for engineering machinery like mills: he did not. His was rather a codification of building ideas for his elite patrons (it is dedicated to Augustus, after all) and the scant attention in the text paid to how machinery actually works mechanically suggests that working engineers were decidedly *not* his intended audience.[18] I also reject the ideas that lack of access to Vitruvius in the Middle Ages and Renaissance somehow held back mechanical engineering—as if access to *De architectura* would have advanced it anyway—*or* that it was the printing of *De architectura* in the 15th century that somehow catalyzed technological development in Europe in that area.[19] Its printing is more a consequence of the new technological mindset making an ancient technological treatise of interest to the incunable era and 16th century, not a cause.

This study is a salvo at understanding how cultures take notice of and record the existence of machinery though the ages. Ultimately, what follows is a small window onto the importance of technology to Western society in the Middle Ages.[20] Investigating it in this way will cast the modern concept of technology into somewhat starker relief. This helps us better understand

16 This is largely the case in most recent work on the history of gears: William P. Crosher, *A Gear Chronology: Significant Events and Dates Affecting Gear Development* (Bloomington, 2014). Jože Hlebanja and Gorazd Hlebanja, "An Overview of the Development of Gears," in *Power Transmissions*, ed. George Dobre, 55–81 (Dordrecht, 2013); and Vincenzo Vullo, *Gears, Volume 3: A Concise History* (Cham, 2020).

17 The *editio princeps* is considered to be from 1486–87 (Vitruvius Pollio, *L. Victruuii Pollionis ad Cesarem Augustum De architectura liber primus–decimus*, ed. Joannes Sulpitius Verulanus [Rome, 1487–87]), though there is also an edition printed by G. Herolt in Rome sometimes estimated to be from 1482.

18 Compare this to the much more technically detailed and useful ancient treaties on mechanical artillery in Marsden, *Greek and Roman Artillery*.

19 Knobloch, "Mathematical Methods," 7.

20 Some attention to the relation of gearing East and West has been paid: M.J.T. Lewis, "The South-Pointing Chariot in Rome: Gearing in China and the West," *History of Technology* 14 (1993): 77–99; Kuo-Hung Hsiao and Hong-Sen Yan, "Gear and Cam Mechanisms," in *Mechanisms in Ancient Chinese Books with Illustrations*, ed. Kuo-Hung Hsiao and Hong-Sen Yan, 169–89 (Cham, 2014).

how we can and cannot (or, normatively, should and should not) speak of medieval technology.

1 Vitruvian Core

The Vitruvian *architector* is both our architect and our engineer. He could design buildings, but he could also build them or oversee the builders who did. It is notable that Vitruvius included a book on mechanical engineering in *De architectura*, but it is just as notable that this is the *last* book of the work. It makes sense (to us, but then we are the legacy of this) that the first six books should be about elements we recognize as the core of architecture—the site, layout, and individual elements of the building—and then that books on ancillary architectural matters such as scenography conclude the treatise. But even here, note that finish and colors for buildings, their water supply, and even time-telling devices—not all of which are even parts *of* buildings—all take precedence over machines, and only a few of those are ones with which one builds buildings.

De architectura Bk. X on machines seems at times a hodgepodge of topics: the opening chapters on hoisting and mechanics seem related to building, but then come five chapters on water-moving devices, one on the *hodometer*, and five more on military machines[21] that bring a certain amount of closure since they are what *un*build buildings, one supposes. It almost looks like a hurriedly assembled list of the 'other' things an *architector* might encounter on, or near, a building site, or more likely could be called upon to build, brought together to make a reasonable tenth book (ten being a perfect number, of course). To be more generous, it is at the very least the material that one figures Vitruvius felt he ought to include but that did not fit elsewhere. It was less important than painting, but it was at least important enough to be considered relevant.

Leaving aside the logic of the last book, it is primarily *De arch.* X.5 that is of interest for this investigation. In this brief chapter on waterwheels and mills, Vitruvius offers the earliest surviving textual description of a set of power gearing.[22] Following a relatively detailed chapter on *tympana*, or water-raising

21 These five are noticeably similar to the text of his contemporary, Athenaeus Mechanicus: see David Whitehead and Philip H. Blyth, *Athenaeus Mechanicus: On Machines* (*Peri mechanematon*) (Stuttgart, 2017).

22 This paper uses the Gwilt translation through the online Thayer portal to Vitruvius; other printed critical editions (Morris H. Morgan, *The Ten Books on Architecture* [Cambridge, MA, 1914]; Ingrid Drake Rowland and Thomas Noble Howe, *Vitruvius: Ten Books on Architecture* [Cambridge, 1999]) do not materially affect my argument.

wheels (X.4), Vitruvius has a *single* paragraph on watermills wherein he describes gearing. He states:

> At one end of the axis [is] a drum-wheel, toothed and framed fast to the said axis; this being placed vertically on the edge turns round with the [water] wheel.[23] Corresponding with the drum-wheel a larger horizontal toothed wheel is placed, working on an axis whose upper head is in the form of a [double-] dovetail, and is inserted into the mill-stone. Thus the teeth of the drum-wheel which is made fast to the axis acting on the teeth of the horizontal wheel, produce the revolution of the mill-stones. (X.5.2)

The terms of relevance here are the "drum-wheel" (*tympanum*) and the "larger horizontal wheel" (*tympanum maius … planum*). The debate over whether Vitruvius was describing spur gears or crown wheels need not detain us here[24] but simply note that in every case Vitruvius simply refers to a mill gear as some type of "wheel with teeth."

Similarly, in the chapter on the odometer (*hodometer*), which today we reconstruct as a one-tooth gear intermittently driving a 400-tooth wheel, Vitruvius again refers to a "drum-wheel having one small tooth" meshing with a "drum-wheel placed to revolve perpendicularly [with] four hundred teeth," and a "third horizontal wheel toothed similarly" (X.9.2–3). In all cases, the terminology is simply a drum (*tympanum*; or in one case a *rota*, or 'wheel') for the wheel and *dentatum*/*denticulum* for large and small gear teeth, respectively. In one place Vitruvius also notes the use of toothed wheels in fine technology of Ctesibian automata (IX.8.5), again with the same words for the parts of the wheel and teeth. He seems not to have any word for a lantern gear[25] which would typically be needed in mill gearing, nor does he have words to

23 Though one imagines that this could be a treadwheel as well.

24 George W. Brooks, "The Mechanization of the Middle Ages: An Intellectual History of Medieval Machine Building," PhD diss., Florida State University, 2003, ch. 1. The other problem is that *tympanum* may also refer to a not-necessarily-toothed rope-winding drum, as Lucretius (*De rerum natura*, ed. William Ellery Leonard [New York, 1916], bk. 4, ll. 904–06) notes: "Many and huge, are moved and hoisted high / By enginery of pulley-blocks and wheels [*trocleas et tympana*] / With but light strain."

25 Lantern gears are those made of rungs set between two parallel discs—though perhaps this is the thickness implied in the word "tympanum" even though it cannot be used technically to mean only a lantern gear: he has "tympana" engaging with other "tympana," which lantern gears cannot do.

differentiate a spur gear from a crown gear,[26] though one can probably discern which ought to be which from his description.

I dwell on his words not to criticize Vitruvius, but to point out that linguistically he had no single word for *gear*—a mechanical component we take for granted today and which we often carefully differentiate by type and that is iconic for mills and for technology in general: see for example the logos for the International Molinological Association for the history of mills and milling, the Society for the History of Technology, and symbolizing industry in general the Rotary Club International. Instead, for the Romans it was a "wheel with teeth"; a small point perhaps, but in fact in a culture without machine drawing that we know of, textual transmission of technical knowledge would have depended upon the effective description of components. Craftspeople provided the continuity of construction practice of course, but as medievalists, we are interested in the recorded mindset and framing concepts of the society that regarded these objects.[27]

2 Vitruvian Textual Power Transmission

It has been asserted, without clear evidence, that Conrad Kyeser's early 15th-century *Belefortis* is an example of a medieval work that "derives from lost ancient originals .... For his tympanum water lifter and his Archimedean screw could have been used to illustrate Vitruvius with almost no change."[28] It is likely that some ancient texts were available to medieval and Renaissance authors, certainly in the 15th century, but this might just as well show an unbroken mechanical tradition. Kyeser's imaginative inventions appear to have few if any antecedents on the page, though a close examination of his machine parts show entirely common components. In the matter of passing *De arch.* X.5 from generation to generation in the absence of illustration, however, and apparently in the absence of any connection between the scribal and the mechanical tradition, appreciation of the text can be gleaned from glossing, emendations, or discussion as the literate tried to make sense of Vitruvius's words.

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26 Spur gears have radially set teeth on the edge of the wheel while crown gears have teeth on the face of the disc.

27 Bert S. Hall, "Der Meister sol auch kennen schreiben und lesen: Writings about Technology *c.*1400–ca.1600 A.D. and Their Cultural Implications," in *Early Technologies*, ed. Denise Schmandt-Besserat, 47–58 (Malibu, 1979).

28 Foley et al., "Origin of Gearing," 123, and see Conrad Kyeser and Götz Quarg, *Bellifortis* (Düsseldorf, 1967).

From the surviving manuscripts, it is nearly certain that no machine drawings were ever in the *urtext*(*s*) for *De arch.* X. Vitruvius in the Middle Ages was unillustrated: of the 78 manuscripts Carol Krinsky cataloged in the 1960s, only a tiny handful had any illustrations at all, and she notes none in his Bk. X. As to the interaction with the text by later scribes and glossators, using as a proxy the seven copies from the 8th to the 15th century that survive in the British Library, it can be said that medieval manuscripts follow X.5.2 virtually verbatim, with no marginal glosses or emendations.[29] The only interesting thing about the passage is that in all seven manuscripts, the copyists wrote *malarum* for *molarum*—rendering the meaning of "produce the revolution of the millstones" as "produce the revolution of the jawbone" or "… of the evil"(!). Only two later hands ever even noticed the scribal error and corrected the 'a' to an 'o,' suggesting how little this passage was read with any care.

When Daniele Barbaro published Latin and Italian commentary editions of Vitruvius in 1567, he broke up the original 16 chapters of Bk. X into 21 and provided extensive commentary to every chapter *except* X.4 and X.5, suggesting that of all the topics in Bk. X, the water-raising machinery and mills needed no explanation.[30] Another translator, two decades earlier, added a small commentary to this section in his edition, but saw no need to explain the text. Instead, he simply added a woodcut and said, "But for the obvious example of this wheel, look at the figure above," and then added that, "such machinery was quite common at the time and … is still sought daily, so that there is hardly a difficult and hard job found today where people [don't] direct their toil [to the mill]."[31] Barbaro, too, added detailed (though with scenic intent rather than fully mechanical) woodcuts to the work depicting the *rota* of X.4 and X.5, and further explained that, "The interpretation and the figures, having understood the things that are more difficult, and seeing the examples in proper order spare

29 Harley 2767, fol. 148 (VIII–IX *c.*), Cotton Cleopatra D.1, fol. 74v (X–XI *c.*), Harley 3859, fol. 358r (XI–XII *c.*), Add. 38,818, fol. 103v (XII–XIII *c.*), Harley 2760, fol. 70 (XIII–XV *c.*), Arundel 122, fol. 131r (XV *c.*), and Harley 2508, fol. 162r–v (XV *c.*). For a collation of those manuscripts' text of *De arch* X.5.2, see Steven A. Walton, "ReCOGnition: Medieval Gearing from Vitruvius to Print," *AVISTA Forum Journal* 19, nos. 1/2 (2009): 28–41.

30 Vitruvius Pollio, *M. Vitrvvii Pollionis De architectvra libri decem*, ed. Daniel Barbaro (Venice, 1567), 345–46: X.4 on "De organorum ad aquam hauriendam generibus, & primum de tympano," and X.5 on "De rotis, & tympanis ad molendam farina," which became Barbaro's cap. 9 and 10.

31 Gualtherius Rivius, [Walter Ryff], *Vitruuius Teutsch* (Nuremberg, 1548), 305r: "Aber zum augenscheinlichen Exempel dieses Rads beschau vorgehende Figur" and "solche Rüstung dieser zeit fast gemein … und noch täglichen ersucht wird / also das kaum ein arbeit gefunden werden mag so schwer und hart dem Menschen dieser zeit / als an das Mühlwerk gerichtet wird."

me the effort of commenting on this and other chapters of Vitruvius."[32] Here the grain mill is shown with a crisply delineated gear train in the undercroft of the mill and an undershot waterwheel outside the building directly driving a thick vertical wheel with pegs on its left face inside the building, which in turn turns a tall lantern gear directly under the millstone (Figure 11.1). The image,

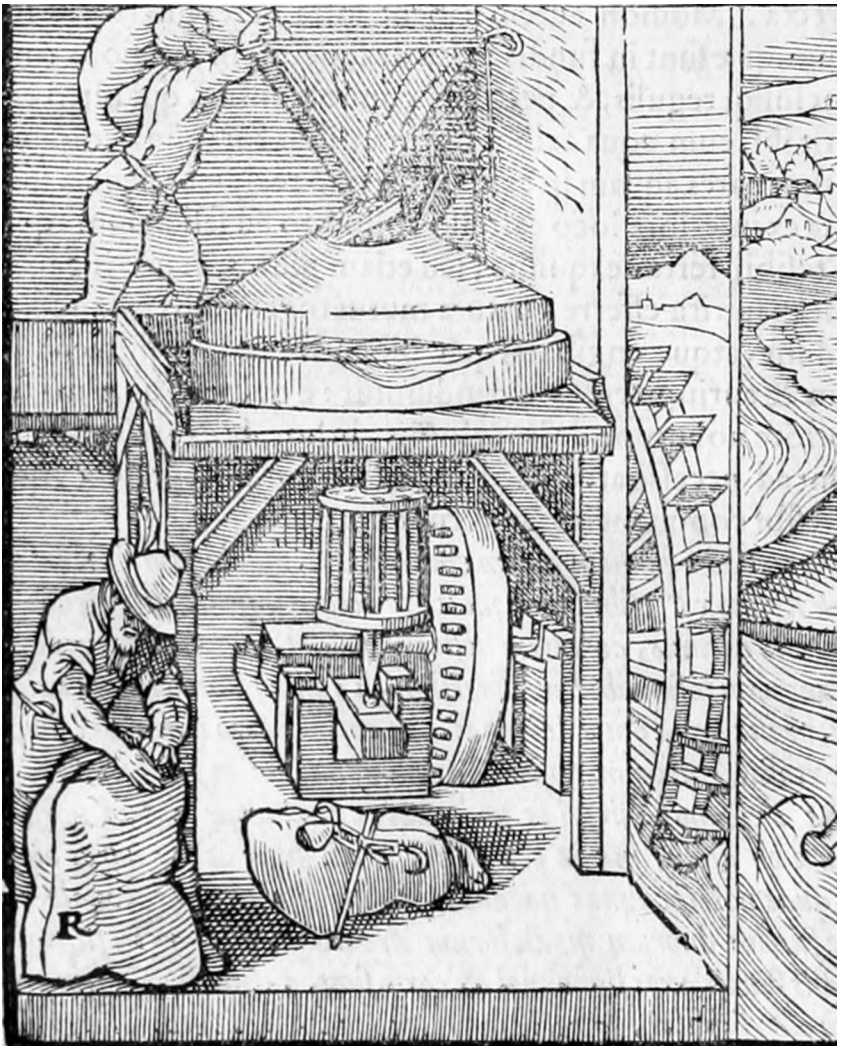

FIGURE 11.1 The mola farina, *M. Vitrvvii Pollionis De architectvra libri decem* (Venice, 1567), 348 (detail)
COURTESY OF THE GETTY RESEARCH INSTITUTE VIA ARCHIVE.ORG

32 Kim Williams, *Daniele Barbaro's Vitruvius of 1567* (Cham, 2019), 773 commenting on Vitruvius X.9.

however, is not captioned. Indeed, in his other images of geared machinery, gears themselves are obscured or enclosed (except the *hodometer* [p. 353], but its gears are crudely drawn and look like a pointy crown and sunburst), and adjacent commentary is on Ctesibian water-raising machinery rather than the gears that would have moved them.

In the earliest full translation of Vitruvius into English in the late 18th century, William Newton noted that although Vitruvius says in the opening of X.5.2 that "By the same means are the *hydraulæ* moved," earlier editors had changed *hydraulæ* to *hydromylaæ* (surely not a legitimate ancient word). This change, according to earlier authors, was to explicitly emphasize water*mills* rather than simply water*wheels*. Their motivations seem to be tied to the modern (that is, postclassical) notion that mills (the whole) are important while waterwheels (the part) are not. Newton argues for a more general meaning of *hydraulæ*, however, suggesting it "may … have been used by the Romans, as the common name of all machines moved by water."[33] And that signification of a common name—in our case "gear"—is the crux of the matter here.

Regarding the passage that describes the second gear wheel as being larger (*maius*), those concerned with how the machinery actually worked have argued that this second wheel should in fact be smaller (*minus*) to derive any mechanical advantage—and indeed, in surviving modern watermills the secondary gear is smaller so that the millstone moves more rapidly than the waterwheel. Newton argued that the modern emendation of *maius* to *minus* was uncalled for, "we ought to be cautious of altering the text in passages where all the copies agree" (and indeed, all the British Library copies unequivocally have *maius* and modern editions repeat it, though often note it should be *minus*). Newton further argued that,

> The antient [sic] mills may have differed from the modern ones in this respect, and yet have performed their office as well. For, although by such a construction the mill-stone would be moved slower, it would however be moved easier, as being moved by a longer lever; or, if the water wheel should have been smaller than ours, it would revolve quicker, and thus cause the mill-stone to revolve as quickly as ours does. Or, thirdly, if the mill-stone itself should have been larger its velocity at the circumference may have been greater than that of a smaller mill-stone whose

33 William Newton, *The Architecture of M. Vitruvius Pollio* (London, 1791), 245 and 245n1*. Newton's debate was with the Vitruvian editions of Perrault, *Abregé* (1674) and Galiani, *L'Architettura* (1758). It is also interesting that he would say this at the time, given that the Industrial Revolution was turning 'mill' into a more general term for a manufactory.

> revolutions are quicker, and also would have contained a greater quantity of grain under action at the same time; so that the intention might be as well executed by a mill of such construction, as by those in present use.[34]

It was only in the late 18th century, then, that the debate about *how* the Vitruvian mill was geared become an issue. Before this, by and large, editors and commentators accepted what Vitruvius had written. Or, more precisely, it was only in the 17th century that the editors and commentators tried to rectify the long-established mechanical tradition with the ancient textual one. Newton goes on in the same note to argue that "Perrault [a late 17th-century Vitruvian commentator] has represented the mill-stone wheel as being composed of spindles, instead of teeth, as Vitruvius describes; because, he says, they are so at present: as if it were not possible for the antient [sic] mills to be made different than the moderns." We must surely be aware of reading the book of the past through the lens of the present. To do so is not necessarily wrong; to do so unaware most certainly is.

3 Words and Objects

The words that we take for granted today to describe the mechanical transmission of power are postmedieval. We also take for granted that words can accurately transmit technical knowledge, at least to the initiated. A case in point from the very beginning of the modern era will highlight the difficulty in words and images in explaining a fairly simple technical object: a worm gear turning a spur gear.

Although Archimedes invented a machine that used a worm-spur combination to magnify force to lift a ship single-handedly, in the early 17th century Robert Norton noted that although "many, as well Historiographers, as others, have in theyr works mentioned" this sort of worm gear, "none have hitherto set downe the perfect framing thereof, save only the learned *Besson*; who hath thus left it unto posterity."[35] The problem came in both the lexical and visual

34 Newton, *Architecture of M. Vitruvius Pollio*, 245n4*.

35 Robert Norton, *A Mathematical Appendix: Containing Many Propositions and Conclusions Mathematicall* (London, 1604), 38–39. Worm gears have proportionally higher gear ratios than spur gears and are much more compact; they can, however, only act as the drive gear (imparting, not receiving motion) and must necessarily gear *down*, so are only good for generating high torque, low speed output. Norton is referring to Besson, *Theatrum instrumentorum* (1578), who depicted two worm gears: a cranked one turning a sprocket that hoisted a sort of conveyor belt of pots for moving earthen fill for walls (fig. 39 and Prop.

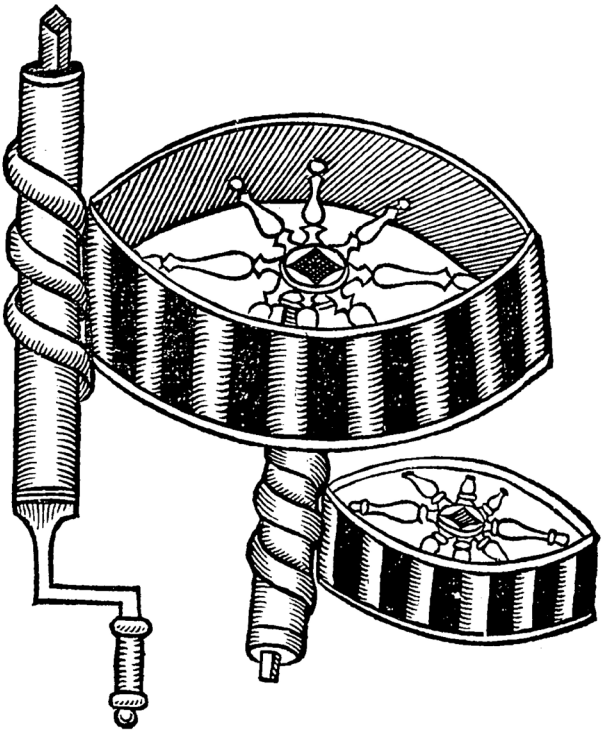

FIGURE 11.2 Depiction of Worm and Spur gears, from Robert Norton, *A Mathematical Appendix* London, 1604, 39 REPRODUCED WITH PERMISSION OF THE BL

vocabulary to describe a geared system; Norton used 'screw' for the worm gears and the simple 'wheel' for a spur gear, although he effectively and rather dramatically failed to represent the compound object in his adjacent illustration (Figure 11.2); his image is partly cribbed from Besson's visual grammar for depicting a concave gear face. Further, even when his vocabulary begins to allow him to describe the machine, difficulties arise. "The first screw," he says,

> must have a handle to turne about like the handle of a handmyll or grinding stone; and so fitted, as being turned round, it may also turne the first wheel, by means of the oblique swellings of the same screw, falling between the Teeth of Cogs of the saide first wheel.

XXXIX) and an industrial press that used a triple press screw whose three captured drive nuts with concave faces were driven by three worm gears on a common shaft (fig. 49 and Prop. XLIX). In the text, Besson really does not explain the worm gear at all, even though he depicts it clearly in the images.

Not only does he have to allude to other mechanical technologies that his readers would presumably know to explain his diagram, but he still can only resort to the term 'wheeles' with 'teeth or cogs'. Other illustrators throughout the 15th and 16th centuries had similar trouble representing the worm gear and it seems like many had never seen what they were trying to depict.

Still, a consideration of the magnification of force (what we now call mechanical advantage) was taking place—perhaps finally—in the Vitruvian context. Norton shows how each screw-wheel combination magnifies the force 20 times, hypothesizing an increase in his machine of four sets of these combinations of 160,000 (20^4) times the initial force (ignoring friction). That said, he also recognizes the "slownesse of this Engin" would be a problem, for 160,000 times stronger also means 160,000 times slower. His solution was to take "away one or two of the last wheeles screwes and Axis, and in their places to use common Pullies, whereof *Vitruvius* wryteth in his tenth booke and third Chapter."[36] So even an engineer at the beginning of James I's reign *was* reading Vitruvius (as well as the then finally available early 4th-century Pappus of Alexandria, whom he also cites elsewhere)[37] for mechanical engineering information, but still had not a single word for 'gear.'

The word 'gear' itself is recorded in Middle English as far back as the early 13th century for general equipment, especially movable, personal equipment such as armor, clothing, and riding harness.[38] In fact, even in the definition of 'gear' as apparatus in the *OED*, the emphasis is on individual portable objects—as we might today speak of fish*ing* gear or camp*ing* gear or climb*ing* gear, noting that today gear is the equipment for undertaking an action. The word derives from an Old Norse root for 'ready,' and hence the participial—i.e., participatory—form of the adjectives modifying 'gear' just mentioned. 'Gear'

36 Norton, *Mathematical Appendix*, 37–38. Vitruvius X.3 speaks of the relation of circular and linear motion, and converting one to the other.

37 It was Pappus, not Vitruvius, that would have given Norton the mathematical framing for gear ratios. See Federico Commandino, *Pappi Alexandrini mathematicae collectione* (Pisa, 1588 [rpt. 1602]; rpt. Venice, 1589), bk. 8 on mechanics. Problem 28, proposition 34 is on worm gears: "Teaching coherently and clearly how a *cochlea* [lit. "snail," but here the term for a worm gear] is constructed, its spirals having slanting teeth [against] the drum" (Quomodo autem construatur cochlea, helicum habens obliquis dentibus tympani dati congruentem ita manifestum erit) [1588 ed., 328r–329v]). There is also a section on the *cochlea* itself (331v–[332]v) and Prob. 6, prop. 10 is on "How to move a given weight with a given power" (Ad eandem contemplationem atiinet Datum pondus data potentia mouere [314r–316r]) and includes a cranked five-gear transmission box, attributed to Archimedes and seen in Heron's *Mechanica/Dioptra* (Russo, *Forgotten Revolution*, 99), with this same sort of compound gear ratio analysis [with a woodcut on 314v].

38 For this, see *OED*, sb. 'gear,' passim, and n. 6a for the mechanical concept under discussion.

in the sense of items about which Vitruvius is writing in X.5.2 and which we instantly recognize as toothed-wheel machine parts has a very late pedigree. The *OED* can only refer to a 16th-century book on surveying wherein the author mentions "the mylner shall make all the coste, both of the hous and the go*inge* geyre"[39] (note already a participial form), suggesting that it is everything inside the mill that counts as the 'geyre': *our* gears, as well as the axles, brakes, stones, and even the mill wheel itself and maybe even the hopper—that is, all the *moving* parts. Our restricted sense of a discreet wheel with teeth is not clearly recorded in the *OED* until 1829; only with the full-blown Industrial Revolution under way is the general term for working parts inscribed on the individual (and key) object itself. That is, it was not until the arrival of modern industry that the image of the word 'gear' became a synecdoche, with the particular evoking the idea of the whole. It seems rather that in the Middle Ages, the *whole* invoked the particular.

Other medieval writers, however, did need to make some sense of the mechanical world in words, especially when translating between languages. At the opening of the 12th century, Aldhelm glossed the Latin term *rota hauitoria* (literally a wheel for 'drawing' or 'scooping' [water]) with *hlædtrendle*, or 'lead-roller,' as well with *hweowla* and *hweowl*, apparently a distinct meaning of the word for wheel.[40] The suggestion is that 'wheel' (also *qwelle* in Middle English) referred to the waterwheel more than the gear wheels. Notice that here, too, 'wheel' is an unspecific term in need of a modifying term such as 'water-,' 'gear-,' or 'scooping-,' as it was throughout Middle English.[41]

As implied by the title of this essay, 'cog' is the key word that refers to gears, at least in Middle English. But even here the use of this term, which comes from the Old English *cycgel*, 'knobbed stick or cudgel,' is not attested until the mid-13th century, referring to the whole mill or entire wheel. The "Owl and Nightingale" poem mentions "one frogge that sit at [m]ulne vnder cogge," that

39 John Fitzherbert, *Here begynneth a ryght frutefull mater: and hath to name the boke of surueyeng and improumentes* (London, 1523), xx.42, emphasis added.

40 *OED*, sb. 'wheel' n.I.1b, citing a gloss by Aldhelm: Arthur S Napier, ed., *Old English Glosses: Chiefly Unpublished* (Oxford, 1900; rpt. Hildesheim, 1969), 15/1. *Havrio* is the very meaning to draw or scoop up and typically refers to water-drawing, but can also refer to digging solids, hollowing out, or even drinking. See *OLD*, 787–88, sb. 'huario'. A *rota hauritoria*, 'scoop wheel,' was probably a water-raising tympanum.

41 Henry Bradley, *A Middle English Dictionary* (Oxford, 1891), 359 notes that already compounds like *wel-barowe*, *whel-spor* (wheel-track), and *whel-wri3t* (wheelwright) were also using the general *hweol* as an adjective itself.

is "at the mill [building], under the cog [wheel]."[42] By and large, though, 'cog' is not a common Middle English word at all. By the end of the 14th century it remains ambiguous, likely referring to the whole going machinery, as in an assessment of the Walleshend windmill near Willyngton (now in east Newcastle). There the assessor noted that William Edward owned his house, the mill (*molas*), and 'large timber' (*grossum meremium*, perhaps lumber for repairs to the mill, or could suggest it was itself a sawmill). Edward's was a windmill, though that can only be inferred from the last items in the assessment: "the foresaid William's sails and cogs" (*velas*, *cogges*). Here 'cogges' must presumably refer to all the machinery of the mill.[43] But to say that the term referring to the machine part does not appear in English before the 14th century is really only to say that it does not exist in the literary record before that time. And the English literary record is awfully thin before that date; it was only in the later 13th century that the court vernacular started to shift away from French, for example, so to indict at least the English for not using 'gear' to describe the machine part puts the cart before the horse (I leave it to those more linguistically skilled in Continental languages to investigate the situation there). In Latin, however, things are no better.

There is a very curious term *scarioballum*/*scorioballum* and the related *striabellum* that appear in the mid-15th century as a Latin gloss on the Middle English *cogge* and the French *alçuns* (*alisuns*/*alluchon*, 'tooth') and *nouis*/*nuys* (*nœud*, 'knob'), suggesting that the Latin term refers to what we recognize as a gear tooth or gear itself.[44] DuCange refers to them as a sort of spindle *or* "fixed node" (*nodi fixi*) in the smaller wheel of the mill that drives the rest of it, so we would probably refer to this as a pinion.[45] Neither the word nor any clear cognate appears in the classical corpus, but in a late 15th-century gloss,

42 J.H.G. Grattan and G.F.H. Sykes, eds., *The Owl and the Nightingale*, EETS extra ser. 119 (London, 1935; rpt. Millwood, NY, 1973), 86.

43 J. Booth, *Halmota Prioratus Dunelmensis: Extracts from the Halmote Court or Manor Rolls of the Prior and Convent of Durham, 1296–1384*, Surtees Society 82 (Durham, 1889), 170; *MED*, sb. 'cogge' 2.

44 Walter William Skeat, *An Etymological Dictionary of the English Language* (Oxford, 1893), sb. 'cog'; Rothwell, "From Latin to Anglo-French," 591 and Tony Hunt, *Teaching and Learning Latin in Thirteenth-Century England* (Woodbridge, 1991), 13.

45 Domino Du Cange, et al., *Glossarium mediae et infimae latinitatis* (Niort, 1883–87). Online at http://ducange.enc.sorbonne.fr/SCARIOBALA, 7: col. 339c, "Scariobala: Sunt quidam fusi sive nodi fixi in rota inferiori, qui movent fusum molendini." That said, he also offers a mid-14th-century source that gives a synonym of "cavillæ," which is all the more confusing as the root "cavill-" refers to "jeering, raillery, scoffing" … though it can also relate to subtle sophistry (verging on deceit), so perhaps this is a nod to the ingeniousness of geared machinery (artificers and mathematicians in the 16th century were called "jugglers" for

it refers to just the tooth: "*Hoc striaballum*, a cog of a welle."[46] By 1440 in the first English-Latin dictionary, the *Promptorium parvulorum*, it is defined as the "cogge of a mylle," which is neither clear as the tooth, the wheel, or the entire going gear with 'cogge' functioning as a collective noun.[47] Soon thereafter, in a 15th-century Latin and English vocabulary it referred to the whole "cogwheel" as well as *scarioballo* becoming a verb meaning the same as the English *coggen*, "to furnish a mill with a cogwheel"[48]—so a verb relating what a millwright does.

Slightly earlier, John of Garland's *Dictionarius* contains *scarioballum* in his text on the mill:

> Mill-wrights construct hoppers and various wheels and flumes and 'gears' [*scarioballa*] and floodgates. And in these are located the millstones, which mill (grind) the wheat to flour, and is shoveled down from the mill in the flour chute.[49]

The main manuscripts of the *Dictionarius* surviving at Cambridge, Dublin, and Lincoln include a series of glosses on the various mill parts, and for *scarioballa*, the following options are noted: in English, 'kogges,' 'gog,' 'cockes' or 'cogges';

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their amazing feats, but the term also took on the suspicion of deceit; Hill, "Jugglers or Scholars?").

46 Thomas Wright and Richard Paul Wülcker, *Anglo-Saxon and Old English Vocabularies* (London, 1884), 1:725, ln. 7. H. Nettleship, "Notes on Latin Lexicography," *Journal of Philology* 19 (1891): 108 notes passages in Varro's *Lingua Latina* and Servius on Vergil's *Georgics*, and wonders, oddly, whether these "difficult words be corruptions of a tribulum?" The *tribulum* was a type of wooden threshing sledge or harrow with projecting wooden pegs or teeth below to sir up the soil, but the shift from *tribulum* to *striabellum*/*scarioballum* /*scorioballum* seems quite the corruption indeed.

47 Anthony L. Mahew, *The Promptorium parvulorum: The First English-Latin Dictionary*, EETS extra ser. 102 (Oxford, 1908), 89, in this case edited from British Library, Harley ms 221. It reappears in 1483 with the same meaning; Sidney Herrtage and John Hervon, *Catholicon Anglicum: An English-Latin Wordbook, Dated 1483*, EETS original ser. 75 (Oxford, 1881), 70. See also *MED*, sb. 'cog,' 2b.

48 Wright and Wückler, *Anglo-Saxon and Old English Vocabularies*, 1:610, ln. 27: "Scoriobal-lum, an^{ce}, a cogwheel." For *coggen* from *c.*1475, see Albert Way, *Promptorium parvulorum sive clericorum: lexicon anglo-latinum princeps* (London, 1843), 1:85.

49 Hunt, *Teaching and Learning Latin*, 1:199: "Molendiniarri fabricant faricapsias et rotas versitiles et aquaticas et *scarioballa* et cinoglocitorium. Et apte collocant molars, qui molunt de faricapista farina, que batillo molendini descendit in alveum farinosum." For full background on the *Dictionarius*, including the details on manuscripts and transmission, see Hunt, 2:191–95; Charles Homer Haskins, *Studies in Medieval Culture* (Oxford, 1929), 81ff.; and Johannes de Garlandia, *The Dictionarius*, trans. Barbara Blatt Rubin (Lawrence, 1981).

and in French, 'alisons,' 'aleçuns,' and 'le nousi, coggis,' or 'noys radii (lé nus de la re),' the last referring to the 'knobs' or teeth, but also perhaps relating the idea of a geared pinion to that of a nut on a bolt (*noix*, though today in French machine nuts are *écrou*), which would fit and is attested at least back as far as the early 15th century in English.[50]

Where the Latin term defines "a cog of a welle," it occurs in a list of names of things relevant to the household (*nomina domo pertinencia*), such as furniture, cooking equipment, and tools. It appears in a small subsection of the parts of a watermill that lists such components as a "mylnepit" (*assicus*), "meltyere" (*emolimentum*, that is "multure," the profit or toll for grinding),[51] "hopyr" and "trowght" (*ferricapsa*/*alvus*),[52] and "flodgat" and "clape" (*sinoglossotorium*/*terratorium*), both regulators for the water flow over the wheel. And in an interesting West-country metrical vocabulary from the 15th century (though the editors posit it may be earlier) we read the couplet:

> Far[ina], mola, molaris, faricapsa, scariaballum;
> Batillum, rota, sinoglostorium quoque fusus.[53]

Above each Latin word the copyist has inserted the English equivalent, giving,

> Corne, mylle, mylston, bynne, kog
> clakke, whele, flodeyate, [and] spyndulle.[54]

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50 Hunt, *Teaching and Learning Latin* 2: sec. 9, 125–56. *OED*, sb. 'nut' n.[1] sense A.IV.16 meaning small cogwheel attested from 1428 and A.IV.17a for the threaded fastener on a bolt from 1507 (sense A.IV.18a refers to the single-toothed rotating string catch on a crossbow from 1528 though that term is uniformly 'nut' [Lat.: *noixta*, *noista*; Fr.: *nois*/*noix*; Ger.: *nuss*] in most European languages from at least the 14th century; my thanks to Kelly DeVries for checking into this for me).

51 *Emolimentum* in one dictionary is a variant of *emolumentum*, "gain, profit" (hence the modern "emoluments clause") and in another a synonym of *molinimentum* for a mill-toll (from *mola*/*molino-*, 'Mill'; *MED*, sb. 'toll' 1c). T.L. Charlton. and M.K. Hugh, *An Elementary Latin Dictionary* (New York, 1918), 277.

52 The distinction seems to be between the hopper on top of the millstone that feeds the grain in for grinding, and the storage troughs (sometimes also called hoppers or "seed-leeps") where the grain was stored before grinding. See Way, *Promptorium parvulorum*, 1: 246 n. 2.

53 The inclusion of *fusus* ('spyndulle') is intriguing, as it in other places refers to the textile spindle (e.g., Way, *Promptorium parvulorum*, 1:547), the thing around which a line is wrapped. This is unlikely to refer to the textile technology as millstones and bins are mentioned, so is a *fusus* which could be the lantern gear. This could then relate it to the later *fusee*, a tapered drum-wheel in clocks that adjusts for diminishing driving force as the clock's spring unwinds.

54 Wright and Wückler, *Anglo-Saxon and Old English Vocabularies*, 627.

Here, *scariaballum* is clearly differentiated from *rota* ('whele,' taken here to be the waterwheel), and so now we have it meaning a gearwheel, it would appear. And yet the word then apparently disappears as Latin loses its function in technical vocabulary.

Although relatively rare in either Middle English or Latin, 'cog' is unequivocally found in the context of wind- and watermills, but it only rarely unambiguously refers to the machine part we understand as a gear. It may refer to the tooth, to the gear wheel, or to the entire going machinery. Nonetheless, it is clearly *part* of a mill.

"Mill" itself is classical: *mola* in Latin becomes *milne*/*Muhl*/*moulin*/*molino* in the European vernaculars (and even remains *milj*/*mill* in Finno-Ugric, presumably as a loanword in both cultures, perhaps implying the mill itself was a loan technology), and its use is widespread throughout the Middle Ages. Although it used to be claimed that mills disappeared after the fall of Rome—or some have even argued that the ancient world did not use mills, despite plenty of nontextual evidence to the contrary[55]—it is clear that they were ubiquitous and common.[56] So the question for the final element of this investigation is, if the Vitruvian mill was so common, and gears are necessary in them, why don't we find more textual evidence for, and thus attention to, them?

4 Images of Mills

It is not that the medieval literate classes paid no attention to powered machinery, but the handful of authors who did so, like Villard de Honnecourt, Guido da Vigevano, and of course the later quattrocento Italian artist-engineers (Leonardo da Vinci most famous among them though others were perhaps more important for machinery),[57] left important records of their existence and appreciation in pictures more than in words. Mills themselves, while not the most commonly illustrated item in medieval illumination, can be found with

55 Moses I. Finley, "Technical Innovation and Economic Progress in the Ancient World," *Economic History Review*, 2nd ser. 18 (1965): 29–45.

56 Kevin Greene, "Technological Innovation and Economic Progress in the Ancient World: M.I. Finley Reconsidered," *Economic History Review* 53, no. 1 (2000): 29–59. See also Russo, *Forgotten Revolution*, 243–63 and fig. 9.3.

57 See Plinio Innocenzi, *The Innovators Behind Leonardo: The True Story of the Scientific and Technological Renaissance* (Cham, 2019); Paolo Galluzzi, *The Italian Renaissance of Machines*, trans. by Jonathan Mandelbaum (Cambridge, MA, 2020); idem, "Art and Artifice in the Depiction of Renaissance Machines," in *Power of Images in Early Modern Science*, ed. Wolfgang Lefèvre and Jürgen Renn, 47–68 (Basel, 2003).

some regularity from the 12th century on. When they are shown they sometimes include a small amount of technical detail, such as in the Parisian bridge mills depicted below a scene from the life of Saint Denis, where a boatman poles a client to the mills with his sack of grain. The undershot waterwheels are shown as treadwheels with rungs on axles fixed on one side to a bridge pier and on the other to a wooden trestle mounted on strake-built boats. The small houses atop the trestles hold the milling apparatus and in the left one the miller awaits the grain, while in the center and right houses, millstones and hoppers are clearly seen—yet no gears are shown in this otherwise relatively detailed rendering of the mills. Similarly, in the Luttrell Psalter, an artist painted a crisp thatched cottage with a door, including stout iron strap hinges and a keyhole (perhaps suggesting the value of the machinery and product therein), as well as a colorful five-spoked overshot waterwheel on a partially submerged trestle. Although two wickerwork eel traps upstream in the millrace are shown with great fidelity, no gears on the mill are to be seen.

Millwheels themselves often draw the most attention of artists, becoming multicolored pinwheels, but showing very little machinery. One such case is quite instructive. In two related copies of the medieval bestiary section of Isidore of Seville's *Etymologies*, both from the first quarter of the 13th century, an ass is shown being driven to the mill although the text itself does not mention it, merely relating the etymology of the animal and its recalcitrance (XII.1.38).[58] Clearly both versions are related (Figures 11.3 and 11.4). They show the same driver eating or blowing something and render the drapery over the asses' backs identically, including the upturned and pinned cloth end. The illustrators have, however, taken some liberties in each of the two cases, with one hooded driver prodding his ass on with a multistrand whip, while the other is bareheaded and uses a pole. The Bodleian artist also included a bridle on the ass and a tree in the background. Most instructive here, however, is the rendering of the mill. It is very clear that both are based on the same form with an arched doorway, with only half of the split door shown open. They have near-identical rooflines with ball finials on apex and eves, although the Harley artist has poorly represented the roofing. In the matter of the mill, the waterwheels are similarly rendered as undershot wheels in a

58 See Stephen A. Barney et al., trans., *The Etymologies of Isidore of Seville* (Cambridge, 2006), 249. Many other versions of the *Etymologies* mention the use of the ass as a beast of burden, but none so far as I know mention carrying grain to mills specifically. Another version of a bestiary, however does, offering a typically false etymology: "The word *mulus*, mule, come from the Greek. It is called this in Greek because under the miller's yoke it draws the lumbering millstones, *mola*, in a circle to grind the corn." (Aberdeen Bestiary, fol. 23^{r}). 'Mill' and 'millstone' in Greek are μύλος and μυλόπετρα, respectively, while 'ass' is μουλάρι.

trough with four-spoked hubs and 12 paddles.[59] In the Harley version (Figure 11.3), this wheel with some inner concentric circles is merely shown with a sort of 'crown' on its top. The Bodleian illustrator (Figure 11.4), however, has chosen to show the central gear teeth (the small spokes of which were also vanishingly present in the Harley version, but with no context) engaging with the vertical rungs of the rundle (the lantern gear), as well as a well-rendered hopper, stone, and even flour coming out of the tub.

Admittedly, it is the great mill-wheels or a windmill's sails that obviously draw attention and the gearing on a wind- or watermill is typically on the inside of the structure, blocked from casual observation. Occasionally, however, artists have clearly depicted the inner working of a mill. The now-lost late 12th-century *Hortus delicarium* by Herrard of Landsberg goes to great pains to show a waterwheel composed of floats or *amphora*-like scoops driving a large gear wheel with individually drawn cog teeth, a flattened rundle, and the millstones (Figure 11.5)—although one might wonder whether the gearing was cleaned up ("refreshed" as we would say of architectural renovations of sculpture) in the 19th-century redrawing, because by then the gearing was what they would have expected to be important. In another example, an early 13th-century marginal illustration of a late 11th-century work by Anslem on the circulation of the blood shows a waterwheel with spur wheel and rundle quite clearly (Figure 11.6). Then there is a late 13th-century image of Samson held prisoner at the mill (Judges 16:21: "Then the Philistines seized him, gouged out his eyes and took him down to Gaza. Binding him with bronze shackles, they set him to grinding in the prison") showing an unconnected gearwheel that has sprung a pyramidal trusswork of rods connected to nothing (Figure 11.7). In all cases, it is clear that the mechanical components of the mill gearing can be found in suggestive, perhaps misunderstood, yet identifiable drawings by contemporaneous artists.

Although this cannot claim to be an exhaustive list of images of gears from medieval manuscripts, it is near to it. The fact that the surviving images are all from the late 12th or 13th century should give us pause. This is the period in which the Europeans intensified their mechanical ingenuity and mills for various purposes were started or renewed across the continent.[60] So although

59 This in itself is an interesting detail, as it may be a confusion of the mill trough that likely fed water into the wheel. It may suggest that the wheel rotated inside the trough to concentrate the force of the water, even though this is, I believe, archaeologically unattested in the period.

60 The Cistercians have generally been downplayed as inventors of medieval technology, but they and others still seem to have been using more of it as Europe expanded in the period. See Anna Götlind, *The Messengers of Medieval Technology? Cistercians and Technology in Medieval Scandinavia* (Alingsås, 1990); Lucas, *Ecclesiastical Lordship, Seigneurial*

Asinus.
Asinus & asellus á tedendo dictus. quasi asedus. sed hoc
nomen qđ magis equis conuenebat. ideo hoc ā sumpsit. quia pulsquā equos capere voiet. huic p

FIGURE 11.3 Ass being driven to a mill, fol. 25r (*c.*1230–40). (London, British Library, MS Harley 4751)
REPRODUCED WITH PERMISSION OF THE BL

FIGURE 11.4 Ass being driven to a mill (first half 13th century), fol. 44r. (Oxford, Bodleian Library, Oxford, MS Bodley 764)
REPRODUCED WITH PERMISSION OF THE BODLEIAN LIBRARY

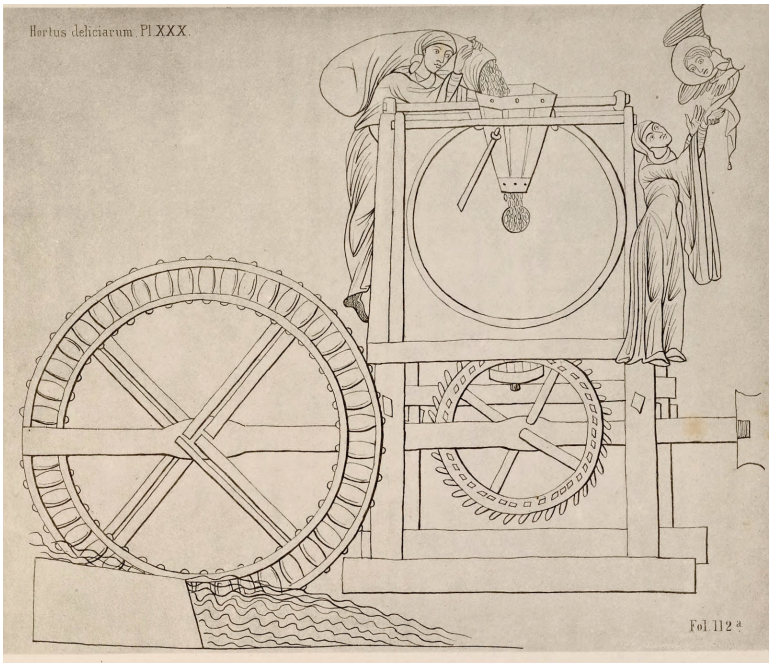

FIGURE 11.5 Mill grinding grain (11th century). Herrad of Landsberg, *Hortus Deliciarum*, ed. G. Keller and A. Straub (Strasbourg: Impr. strasbourgeoise, 1879–99), pl. 30
COURTESY OF THE GETTY RESEARCH INSTITUTE VIA HATHITRUST.ORG

FIGURE 11.6 Internal workings of an early 13th-century mill used as a metaphor for the circulation of the blood by Anslem, fol. 10r. (London, British Library, MS Cotton Cleopatra C.XI)
REPRODUCED WITH PERMISSION OF THE BL

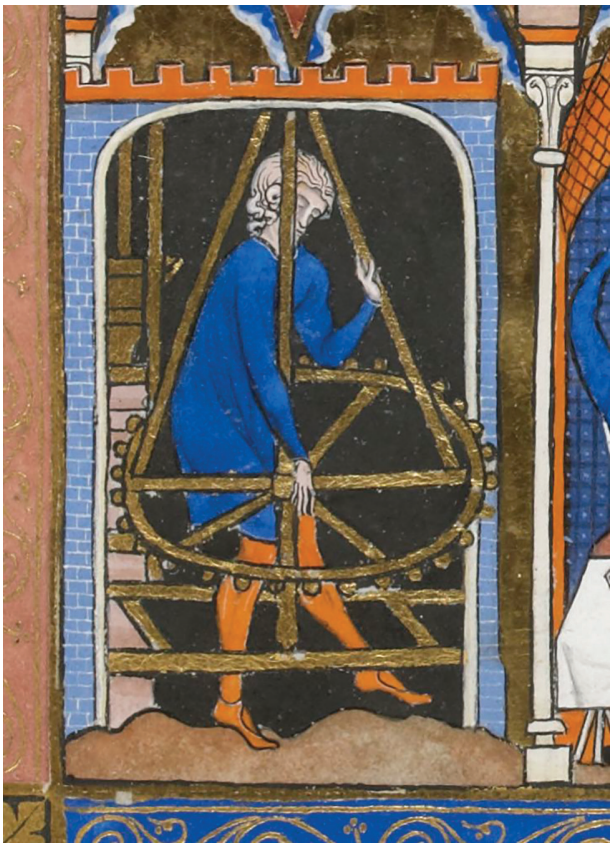

FIGURE 11.7 Samson at the mill, fol. 62r (*c.*1270). (Paris, Bibliothèque nationale de France, MS Latin 10525) REPRODUCED WITH PERMISSION OF THE BNF

medieval Europe had no specific word for 'gear'—though as indicated above, in English at least, 'cog' seems to arise in the next century to describe these machines—it does appear that they were just beginning to recognize that these machine components were important. Why they then seem to retreat in visual importance in the next century is an open question. Gears, by and large, are rarely shown in illustrations, but that they are there at all indicates that medieval commentators (or at least the illustrators) began to recognize the *gear* as the key piece of machinery.

Power and the Commercialization of Milling in Medieval England (Farnham, 2014); Christie Peters, "Industrial Milling and the Prolific Growth of the Cistercian Order in the Twelfth and Thirteenth Centuries," in *Fifty Years of Medieval Technology and Social Change*, ed. Steven A. Walton, 148–62 (London, 2019).

5 Images of Geared Machinery

Medieval illustrators *could* depict information on gearing when it was their task to describe it. Powered machinery can affect movement, magnify force, and change its direction using gears, but also using a number of other mechanisms, including ropes and pulleys. We assume medieval engineers used them in their toolkit without interruption in such obvious, continued uses like construction hoists and sail rigging. Although visual representations of geared machinery (exclusive of mills) in the Middle Ages are exceedingly rare, with fewer than a half dozen before the Italian explosion in the late 15th century, the ways in which gears are rendered is itself illustrative.

Villard de Honnecourt drew numerous mechanical devices in the early part of the 13th century. His automatic saw includes an apparent gear-like component in the middle of the diagram, but its function shows it to be a spiked feed cog, not a gear. Indeed, if the machine were built like this, it would have needed to be geared down to feed the wood into the reciprocating saw more slowly lest it chew up the trunk or break the blade. Either way, Villard's saw shows no gears, nor even implicitly indicates their existence. Villard's "eagle whose head turns when the deacon opens the Bible" clearly makes use of only ropes and a pulley; again, no gears shown, or in this case needed as there is no force magnification (or speed change or change in plane of rotation) which is a specific advantage of gears. His underwater pile-cutting saw only has weights and cords. And his drawing that suggests the greatest possibility for mechanical complexity, of "how to make an angel keep pointing his finger toward the sun," which has always been taken to be an early clock escapement, shows a rope with plummets on either end that winds lazily over two axles and a smooth round wheel on spokes. Not a single indication of a gear in a machine that by rights should have been nothing but gears (this suggests to me that he had never seen a clock; or that he was not in fact trying to describe one).[61] Villard, it seems, is either oblivious to gears or his mindset is to see things in terms of ropes and pulleys rather than gears.[62]

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61 Compare Abbott Payson Usher, *A History a Mechanical Inventions* (Cambridge, MA, 1954), 190 fig. 56 and Maurice Daumas, "Le faux échappement de Villard de Honnecourt," *Revue d'histoire des sciences* 35, no. 1 (1982): 43–54. And see Carl F. Barnes, Jr., *The Portfolio of Villard de Honnecourt* (*Paris, Bibliothèque nationale de France, MS Fr 19093*): *A New Critical Edition and Color Facsimile* (Farnham, 2009), 159.

62 E.R. Truitt, *Medieval Robots: Mechanism, Magic, Nature, and Art* (Philadelphia, 2017), 121 reached the same conclusion.

A century later, we do find relatively unambiguous gearing in a machine drawing manuscript, even if the visual grammar is a challenge to the modern eye. Guido da Vigevano in his *Texaurus regis Francie* from *c.*1335 proposed a number of machines that involved gears to multiply force in order to accomplish the impossible.[63] His battlewagons were optimistically fanciful, but nonetheless appear entirely potentially functional (it is unclear if any such machines were ever built at full scale) as the earliest visual evidence for thinking about applying power gearing to anything other than milling. His chapter "On the way of making a fighting-wagon, which may be propelled without draught-animals in order to disorder large forces, and it can be carried in pieces on horseback" shows a large wheeled and armored wagon that is turned by internal cranks and gears (Figure 11.8). The image is drawn in a sort of proto-Cubist rendering that flattens the plan and elevation into one plane, but shows wheels with round teeth around their circumference, connected through lantern gears (shown as a sort of flattened rectangular cage) to another set of round-toothed wheels connected to the central double cranks with which the soldiers in theory powered the wheels.

The geared wheels are described in Guido's text in words similar to Vitruvius: the "wheels [*rotes*] are fitted with teeth [*dentes*] on the inside towards the wagon, running all the way round a span in from the rim, the teeth being four inches long." Further reference to these gears is simply to the "wheels," with teeth implied. Guido has a specific word for the lantern gears, *cugones*, that may be a case of a Latinization of a vernacular word (though perhaps linguistically related to 'cog,' mechanically it seems to refer to an open lantern gear here).[64]

Similarly, in his wind-powered battlewagon, comparable gearing is shown (Figure 11.9). Here again Guido uses language similar to Vitruvius: "one of these

63 Giustina Ostuni, *Le Macchine del Re. Il Texarus Regis Francie di Guido da Vigevano* (Vigevano, 1993).

64 "And after these [toothed] wheels two *rundle-wheels* made thus are placed between those upper wheels and the [toothed] wheels of the wagon, above the bed of the wagon, and so positioned that by turning the upper [toothed] wheels with the [crank-]handle the *rundle-wheels* are revolved, and the wheels of the wagon (placed thus) are revolved by the *rundle-wheels*." (Et post … has rotas firmentur duo *cugones* sic facti … positi inter ipsas rotas … superiores et rotas carri super lecto carri taliter positi quod volvendo rotas cum manegia volvantur ipsi *cugnones* / et per *cuguones* volvantur rote carri sic positi). Lèfevre and Popplow, *DMD,* /textpage?id=gdv51. 'Cugon-' or 'Cagnio-' do not seem to be Latinate stems and may relate to 'cog.' At least in later Latin, a rundle or lantern gear was simply a *cyllindrus*; Joseph Esmond Riddle et al., *A Copious and Critical English-Latin Lexicon* (New York, 1849), sb. 'cog.'

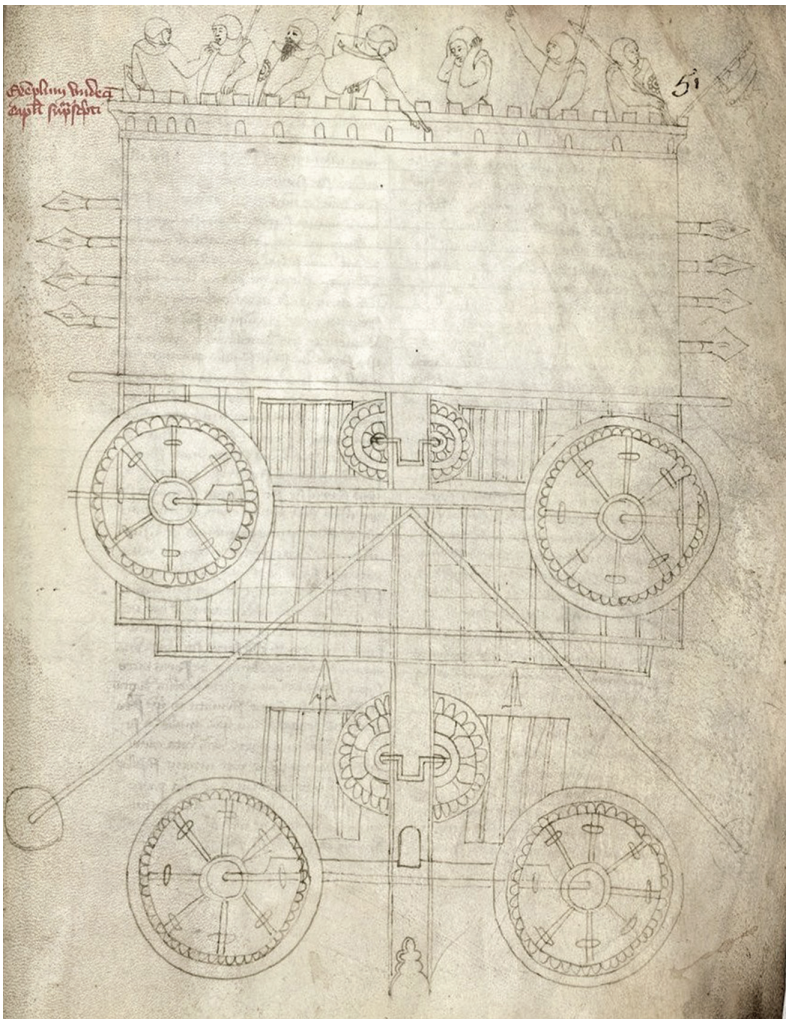

FIGURE 11.8 Guido da Vigevano's geared battlewagon, fol. 51r, *c.*1355. (Paris: Bibliothèque nationale de France ms Latin 11015)
REPRODUCED WITH PERMISSION OF THE BNF

two wheels of the wagon is to be fitted with rundles (*infuselata*)[65] and the other is to be toothed on the side towards the wagon at a distance of one span from the outer rim of the wheel." The text is clear that it is to be a crown wheel, but there is still no word for that object: Guido calls the main driving wheel a

65 Note the possible similarity to *fusus*/*spyndull* (see n. 53, above).

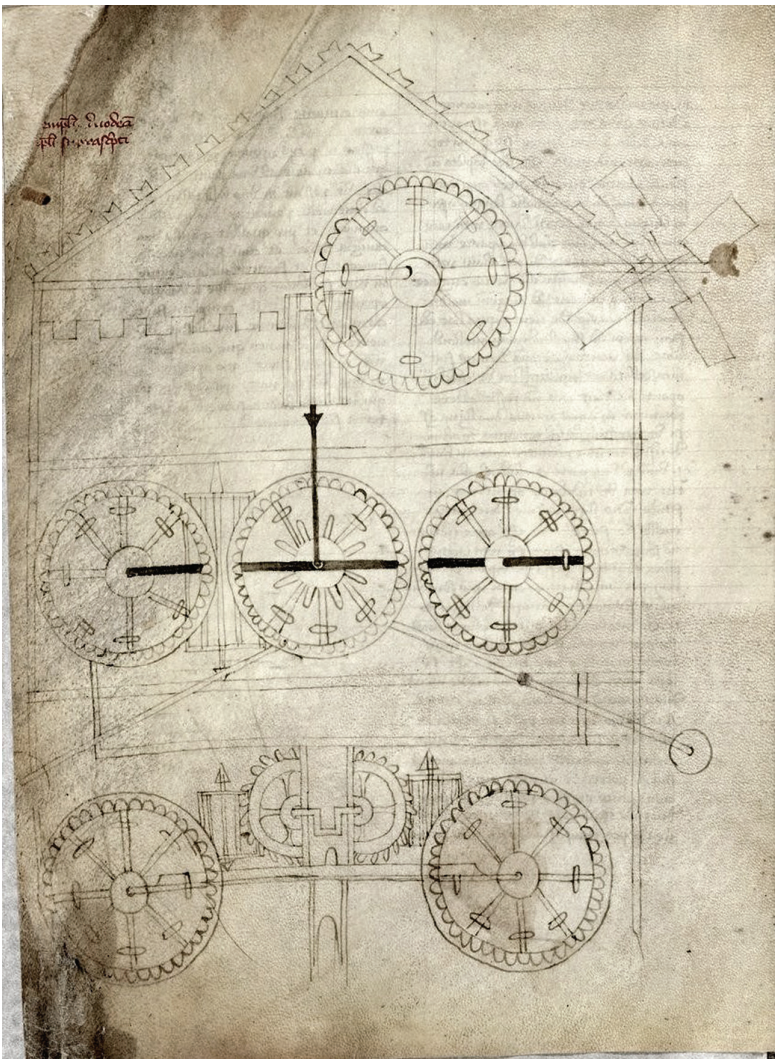

FIGURE 11.9 Guido da Vigevano's wind-powered battlewagon, fol. 52v, *c.*1355. (Paris, Bibliothèque nationale de France ms Latin 11015)
REPRODUCED WITH PERMISSION OF THE BNF

"great wheel toothed on one side" (*una magna rota indentata ab una parte*). And further along, these are simply "toothed wheels" (*rotam indentatam*).[66]

66 The modern translation uses "cog" in one place, although they deviate somewhat from the Latin: "Both the teeth of the horizontal wheel and the teeth of the [second] wag-on-wheel—for this must be fitted with cogs—revolve in [engagement with] this little

This limited terminology, however, does not suggest a lack of understanding of how to describe the machine. The drive system of the upper gears of the wind-powered wagon clearly drives only one wheel (there is no rundle shown on the right-hand side) and then that wheel then drives the other one by means of a solid, more darkly rendered axle, presumably indicating the use of iron for this high-torque application. In this way, Guido makes sure that the wagon is not driven in circles. His attention to detail, in fact, is quite complete, giving the first known verbal description of the rotating cap of a tower mill on a captured-track roller bearing (i.e., a turntable supported on its rim or 'lazy Susan'):

> on the top of the "house" is a round wheel lying flat which is hollowed out inwardly and in the hollow are many little wheels [fixed] with iron pins at a distance of nine inches one from another, and upon those wheels is placed another round wheel so that it may turn about upon the little wheels in the proper way, just as they do in windmills.[67]

Such attention to detail speaks of Guido's clear understanding of the machines he was describing as well as his willingness to take a machine component from one application and use it in another. Whether or not he built them, had them built, saw them built by someone else, or merely imagined them from an understanding of how gearing works cannot be determined from his work. It is clear, however, that by the mid-14th century at least, textual description of gearing was just beginning to roughly match the cognitive understanding of how geared machinery worked. That Guido still needed complex diagrams suggests that the process towards "engineering in the mind's eye" had not yet run its course.[68]

Still, there is some indication that engineers—or at least scribes contemplating engineering—were still having trouble with words for the concepts of these gear trains. In the copy of the *Texaurus* at the Yale Center for British

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pinion" (unum cagnionum sic fatum … in quo volvantur dentes rote iacentis et dentes ipsius rote carri quia ista rota carri debet habere dentes). The translators seem to let *cagnionum* stand in for both 'cog' and 'pinion,' basing their choice on interpreting the illustration rather than the words. Cogs and pinions today imply two similar, though very different sized, machine parts. 'Pinion' come from the Old French *pignon*, the smaller of a pair of cog wheels engaged with one another. By 1328 it is found as *paingnon* and seems connected to the watchmaking trade in the 14th century. Ultimately it derives from the Latin *pectin*, "comb." *OED* sb. 'pinion' n.[4].

67 "Et in capite istius domus sit una rota rotunda plane iacente cavata in medio / et in ipsa cavatura sint multe roele parve cum cavigiis ferri longe una ab altera uno semisse et super istis ruellis ponatur alia rota rotunda et volvatur super ipsis ruellis recte sicut fiunt molendina de vento" (Lèfevre and Popplow, *DMD*, /textpage?id=gdv52v).

68 Eugene S. Ferguson, *Engineering and the Mind's Eye* (Cambridge, MA, 1992).

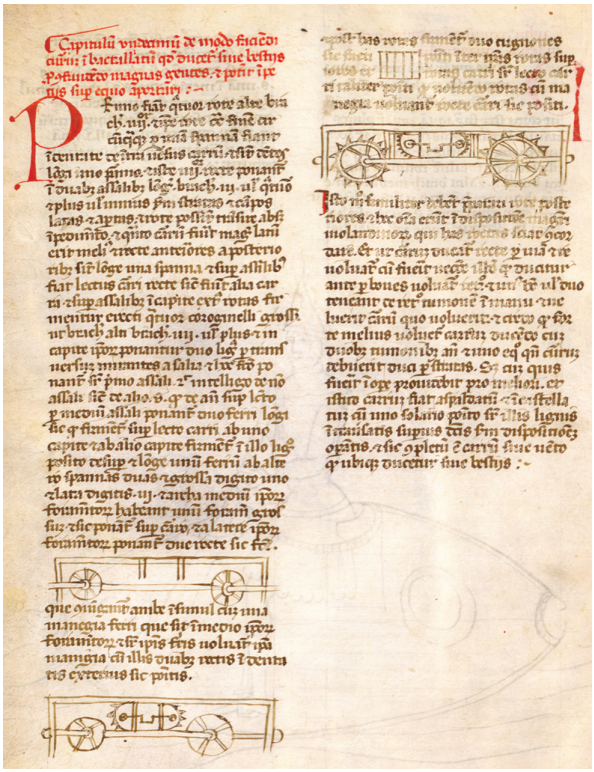

FIGURE 11.10 Detail of the interlineal emendation of Guido da Vigevano's instructions on the gearing of his battlewagon. Guido da Vigevano (*c.*1280–*c.*1350), Liber acquisitionis Te[r]re Sa[n]te de ultra mare : [Christi] no[m]i[n]e invocato : Regi Francie i[n]tytulato, 1375, pen and brown ink on vellum, fol. 14v
NEW HAVEN, YALE CENTER FOR BRITISH ART, PAUL MELLON COLLECTION

Art, the page describing the battlewagon has interlineal details of how the gear trains were to be built (Figure 11.10). It appears to show the installation of the main wheels and their axle, then the drive crank and its gears, and finally how to construct a rundle and to fit between and connect the two gears. Such a sequence seems overly specified to a modern engineering eye, but of course the concepts are reified for us and our visual grammar is now codified.

In reviewing the machine books of the Middle Ages, two features are striking: first, where force multiplication is desired, ropes running through block and tackles are far more commonly seen than reduction gearing; and second, where rotational motion of the machine from a waterwheel or windmill sail is being used for a useful or even an amusing purpose, it is quite rare

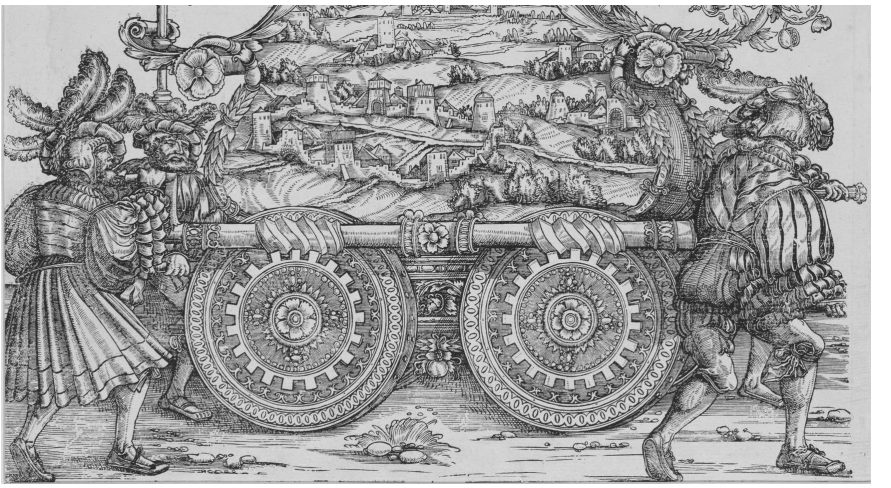

FIGURE 11.11 Hans Burgkmair, Triumph of the Emperor Maximilian I (detail), woodcut, *c.*1516–19
© VICTORIA AND ALBERT MUSEUM, LONDON, ACC. 13079:90

to see any reduction gearing where a modern eye would expect it. One does see a driveshaft connecting the waterwheel to its mechanical task, but the rotational speed for one seems incompatible with the torque requirements of the other. Artists have adopted a sort of visual grammar of wheels with 'bumps' much like Guido's for a driving crown wheel and the flattened gridiron for lantern gears, so it seems likely that they are able to communicate the concept of reduction gearing; they just don't (need to) show it. Whether it is an artistic invention, or the engineers never thought of it, or it would have been impossible (or at least structurally too difficult) to construct, the compound gears that one regularly sees in the 16th century are quite rare until the early 15th century. The earliest example of well-delineated large driving wheels turning small lantern gears to speed up rotation are found in some of the Italian machine books of the very early 15th century, notably those of Johannes Fontana (*c.*1420), Konrad Gruter von Werden (1424), and Taccola (1430s–40s). These authors take care to demonstrate (non-numerically specified) gear ratios and other details beyond the basic concept (Gruter, for example, even described machines with flywheels: *rotis ponderosis impetum sustinenibus*).[69]

69 See Johannes Fontana, *Liber instrumentorum iconographicus: Ein illustriertes Maschinenbuch*, ed. Horst Kranz (Stuttgart, 2014); Frank D. Prager and Gustina Scaglia, eds., *Mariano Taccola and His Book "De ingeneis"* (Cambridge, MA, 1971); and Konrad Gruter von Werden, *De machinis et rebus mechanicis: ein Maschinenbuch aus Italien für den König*

By this time, it is becoming clear that engineer-artists were able to draw machine parts in a way that their readers would be able to understand without adjoining text. In some cases, a subcomponent is shown doing no work—a horse whim which drives a lantern gear that drives nothing, for example[70]—and the reader is to understand that it could then be adapted to whatever purpose they wished. Machines and components are drawn and minimally described, and often the reader is merely instructed to see the picture as words continued to fail these authors. Sometimes in this process, they depicted impossible machines: not perpetual motion machines (though they are there, too), but those that could not, for example, be moved by a single person turning a single small crank—at least not in a machine we assume did not have friction-free bearings.[71] Or in other cases, like the great Triumphal Procession (*Triumphzug*) or Triumphs of Maximilian series of woodcuts by Hans Burgkmair, Albrecht Altdorfer, and other artists (including two by Dürer) from the second decade of the 16th century, cranked and geared procession wagons are realistically depicted. They are shown in a way that does realistically convey that they 'work,' though the component details and gear ratios depicted (especially when worm gears are involved) suggest a slightly hazy understanding of how to make them work effectively (Figure 11.11). And thus, at the dawn of the modern age, machine design entered a phase that would soon particularize into components and movements, and eventually, mathematical analysis.

There is one final curious example of medieval gearing depictions that is worth mentioning, even if it is more provocative than conclusive. A great number of the medieval depictions of gears show teeth that seem to have a certain unidirectionality to them. That is, they look rather saw-tooth-like and even sometimes rake forward as if each tooth was leaning into its task. The one other manner in which Vitruvius speaks of teeth (*dentata*) is in regard to architectural elements that are like a saw (as, for example, in his description of internal wall buttresses: VI.8.7 and I.5.7). This sort of "confusion"—if it is in

von Dänemark: 1393–1424, ed. Dietrich Lohrmann, Horst Kranz, and Ulrich Alertz (Città del Vaticano, 2006). Gruter is notable not for drawing hypothetical machines which may or may not have been made, but for specifying existing machines in specific Italian cities, and in some cases, by known makers (see n. 71, below).

70 "Molendiunum ab equo vel asino circumagendum" (Gruter, 162).

71 For example, Gruter's heavy conveyor belt of wooden slabs moving large amounts of water or earth in Ferrara: "Conductus magistri Bertolini, tabulis concatenatis compositius, ad evacuandum aquam e fovea civtatellae Ferrariensis" (Gruter, 75). On the friction issue, see John Muendel, "Friction and Lubrication in Medieval Europe: The Emergence of Olive Oil as a Superior Agent," *Isis* 86 (1995): 373–93.

fact a confusion—continues well into the 16th century.[72] And even into the 18th century, a philologist took Vitruvius's reference to the teeth of the driving gear being *in cultrum* (set perpendicularly on the edge, as he translated it), as referring to, "on the knife; a mode of expression used to signify the[m] being situated on the side or edge: and *a coltello* is at this day used by the Italians in the same sense."[73] *Cultrum* does mean 'knife,' but can also mean a plowshare. Since the latter are raked forward in the plow, it is possible that Vitruvius was describing raked teeth, or at least later readers might have thought so.

It is also worth remembering that the first mechanical geared clocks were developed in the same period under investigation in this study. Toward the end of the 13th century, likely in northern Italy or southern Germany, some creative individual intuited how to regulate the descent of a weight by means of an oscillating beam escapement. Part of that escapement was the verge or crown-wheel, which did indeed have raked teeth, and that achievement has been well appreciated.[74] The other important achievement by people like Richard of Wallingford and Giovanni di Dondi, though, was to translate the planetary ratios of Ptolemaic astronomy into conceptual gear ratios and then to fabricate brass or iron gears to effect those ratios. This approach to gearing was essentially mathematical and would lead to a plethora of geared clocks, automata, and fine technologies. That said, this approach seems not to have penetrated the realm of powered machinery and there is no indication that engineers of the Middle Ages specifically recorded the exact gear ratios of watermills or windmills. In designing their pairs of spur gears, they must have made some decision about the ratio of sizes, although, unlike planetary rotation rates, the precise ratio and hence speed of the millstone is not crucial. In addition, gear trains of more than two or at most three gears is all that would be necessary for heavy powered machinery, whereas clocks and astronomical dials needed multiple trains each with multiple gear reductions to perform their tasks and of course, in those machines precision and relational precision matter.

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72 Cf. the "Anonymous Sienese Artist 2" (*c.*1490–1500) whose gear rack with crank seems to be driven by a circular saw blade: Gustina Scaglia, *Francesco di Giorgio. Checklist and History of Manuscripts and Drawings in Autographs and Copies from c.1470 to 1687 and Renewed Copies (1764–1839)* (Bethlehem, PA, 1992), 105. There are numerous examples in Gruter, who also colors in his watercolors in brown or gray-blue to differentiate wooden from iron parts, and these saw-gears are uniformly shown as iron.

73 Newton, *The Architecture of M. Vitruvius Pollio*, 245n2*.

74 Gerhard Dohrn-van Rossum, *History of the Hour: Clocks and Modern Temporal Orders* (Chicago, 1996).

It is not until the later 15th century that artist-engineers apparently considered such things as *how* the teeth work and how to make them work more effectively. It does not at all surprise to find such matters as abstracted diagrams with numerical gear ratios in Leonardo da Vinci at the turn of the 16th century. In the previous generation, though, Francesco di Georgio Martini (1439–*c.*1501) also contemplated how one could replace gear teeth with rollers and how that would affect tooth engagement and friction.[75] In order to do so, a cognitive understanding of how the gears pressed against and rotated past one another—for rollers can only exert lateral but not tangential thrust—can be seen reasonably explicit in di Georgio. It is notable, though, that however much we stand in awe of these 15th- and 16th-century artist-engineers, they by and large also only communicated in pictures, not words. We also have to wait until about 1500 until anything that we might consider gear-ratio computations for engineering machinery (as compared to clocks and astronomical devices), which is to note that the *mathematical* contemplation of power machinery gearing, despite what Vitruvius notes in his section on the odometer,[76] will also have to wait until after the Middle Ages.

One of the key features that distinguishes gears as important for us—their supposed scientific nature—is explicitly lacking in the medieval conception of the same objects. This stems from the Aristotelian *naturalia*/*artificalia* divide in which only the natural was considered worth contemplation and exposition by the learned. The artificial, by definition and following Plato, was corrupt and changeable and therefore was not worth much examination, as no certainty could arise. This attitude was to change in the 16th century when 'mathematical' was to become the very definition of certainty, reliability, and even destiny. By the 16th century, Justus Lipsius, for example, said that destiny was either mathematical, natural, or violent: natural destiny was "the order of naturall causes, which … doe produce a certaine and the selfe same effect;" violent was the "necessitie of all thinges and actions, which no force can withstand or breake"; and the "mathematigal destinie, [was] that which tyeth and knitteth firmelie all actions and eventes to the power of the Planettes, and dispositions

75 Scaglia, *Francesco di Giorgio*, no. 52; Massimo Mussini, *Francesco di Giorgio e Vitruvio: Le traduzioni del "De architectura" nei codici Zichy, Spencer 129 e Magliabechiano II.I.141*, Ingenium 6 (Florence, 2002).

76 Vitruvius does not discuss how the hodometer's 1:400 sprocket ratio was derived or what it meant. Foley, "The Origin of Gearing," 123–26, suggests that it was for laying out mileposts on the Augustan road network as it could measure up to 400 miles (the longest road then under construction was only about 375 miles). Vitruvius only says that it was "an invention by no means useless, and delivered to us by the ancients" (X.9.1).

of the Starres."[77] 'Mathematical,' then, was a concept for natural philosophers, not for mechanics. It would not be long before it was discovered (conceived of, really) that the connection between the natural and the artificial could be very effectively bridged using mathematics.[78]

6 Conclusion

If 'gear' as a word is not a medieval concept, then how did contemporaries think of those *rota dentatum* inside the building to which everyone went for their flour? Perhaps the lack of terminology for something we take for granted should not surprise us. Guido da Vigevano, for example, has no word for 'crank' (he just says let the paddle wheels for a boat be fastened to an "iron handle") despite cranked devices having been around for hundreds of years (if, indeed, for much longer).[79] In the case of Vitruvius, interest in his work exploded as the medieval world segued into the early modern. The first printed edition appeared in 1486, followed by two more before 1500, and then at least 23 editions in the following century.[80] It was just at this time that reliable woodcuts appeared in print as well, leading to a considerable elaboration of the sorts of modifications that could be easily depicted, and hence grasped without specialized technical vocabulary.[81]

During the first half of the second millennium of our era, there seems to have been a mindset among mechanically minded people to *not* think in terms of gearing for powered machinery. Gears were the preserve of fine technology and in that area, great strides were made. For powered machinery, ropes and pulleys were seen as the force multipliers of the day and technological

77 Justus Lipsius, *Two Bookes of Constancie*, trans. John Stradling (London, 1595), 43–45.

78 Rens Bod, *A New History of the Humanities: The Search for Principles and Patterns from Antiquity to the Present* (Oxford, 2015), ch. 4.

79 Ch. 8: "Et ista duo ligna insimul coniungantur / cum una manegia de ferro" (Lèfevre and Popplow, DMD, /textpage?id=gdv49). In general, see Lynn Jr White, *Medieval Technology and Social Change* (Oxford, 1962), 103–19; Steven A. Walton, "The Virtuousness of Technology: The Battle of Brunanburh and Anglo-Saxon Sword Manufacture," *Technology and Culture* 36, no. 4 (1995): 987–99; George Brooks, "Of Cranks and Crankshafts: Lynn White, Jr. and the Curious Question of Mechanical Power Transmission," in *Fifty Years of Medieval Technology and Social Change*, ed. Steven A. Walton, 106–32 (London, 2019).

80 Newton, *The Architecture of M. Vitruvius Pollio*, 1:IV–V.

81 Vitruvius, *M. Vitrvvii Pollionis* (ed. Barbaro). Adam Lucas and I are working on this issue and on an edition of Bk. X on machines of the German Rivius, *Vitruuius Teutsch* (1548) and Barbaro's 1586 Italian editions. See also, Elizabeth Tebeaux, *The Emergence of a Tradition: Technical Writing in the English Renaissance, 1475–1640* (Amityville, 1997).

elaboration came from that quarter. This mindset would reach its culmination in woodcuts depicting Domenico Fontana raising the obelisk in Saint Peter's square in 1586 (printed in 1590), where a forest of ropes and capstans rather than gearing magnify the forces of hundreds of men and horses to move the giant granite monolith upright in the piazza.[82] Some of this may be a practical consideration in the strength of available materials and manufacturing abilities to make gears for large machinery, though the millennia of experience with watermills suggests they could have adapted such techniques to other uses. Some may also be that the tasks that engineers were called upon to accomplish (moving heavy weights considerable distances) were not those for which gears are ideally suited (stationary, high-torque or high-speed machines). And some may also be a mental grammar and syntax of machine design that did not see the utility of gears or was partly blind to their use when a tried-and-true rope and pulley would do.

The growth of engineering sciences, where "the so-called mixed mathematics formed the core of what was later to be considered the *sciences de l'ingénieur*, trigonometry and geometry, applied mechanics, and hydrodynamics," would have to wait until the late 17th and really the 18th century.[83] For the millennia and a half preceding it however, attitudes toward gearing demonstrated a decidedly different orientation. We must abandon any astonishment that medieval engineers were able to design reliable geared machinery "without mathematical analysis and automatic reproduction of … tooth curvatures and profiles," and instead focus not only on the mechanical technologies that they *did* make.[84] But we should also try to understand how they conceived of those machines. Then as today, these concepts might vary greatly between practitioner, observer, and theoretician, but also then as today we should realize that cultures do have a *mentalité* about certain kinds of technology. We know that the Middle Ages began to appreciate and elaborate mechanical technology, as well as talk about it and depict it with increasing regularity, so investigating this mindset further should prove both tractable as well as instructive.[85]

82 Domenico Fontana, *Della trasportatione dell'obelisco vaticano* (Milan, 1978).

83 Mario Lucertini et al., eds., *Technological Concepts and Mathematical Models in the Evolution of Modern Engineering Systems: Controlling, Managing, Organizing* (Basel, 2004), VIII.

84 Brian A. Curran, Anthony Grafton, Pamela O. Long, and Benjamin Weiss, *Obelisk: A History* (Cambridge, MA, 2009), 4.

85 This runs in parallel with Russo, *Forgotten Revolution*, 264–67, who notes that the Romans seems to have inherited much if not most of their technological components from the Hellenistic Age, yet did not talk much at all about such mundanity. He also proposes that the Romans managed to 'lose' a fair amount of Greek technology in the process.

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PART 3

Villard de Honnecourt: Gothic Monuments

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CHAPTER 12

Warrior Kings and Savvy Abbots: The Depiction of Contemporary Costume on the Cross of the Scriptures at Clonmacnois

Maggie M. Williams

1 To Distinguish the Honor of Each by His Raiment

The *Annals of the Four Masters* tell us that, in "the Age of the World, 3664" (*c.*1530 B.C.E.), Eochaidh Eadghadhach devised a grammar of Irish garments:[1]

> He was called Eochaidh Eadghadhach (Eochaidh the clothes designer) because it was by him the variety of colour was first put on clothes in Ireland, to distinguish the honour of each by his raiment, from the lowest to the highest. Thus was the distinction made between them: one colour in the clothes of slaves; two in the clothes of soldiers; three in the clothes of goodly heroes, or young lords of territories; six in the clothes of ollavs (chief professors); seven in the clothes of kings and queens.[2]

Although it is unlikely that Eochaidh's exacting system was meticulously adhered to over the course of centuries, it is clear that the color, design, and quality of a person's attire were unmistakable visual indicators of gender, rank, and occupation in ancient and medieval Ireland. The depiction of recognizable costumes in the visual arts was also significant, reflecting and reinforcing the communicative role of dress.[3]

1 Since this article was first published, the Discovery Programme (Centre for Advanced Irish Archaeological Research) has created an excellent 3-D digital model of the Cross of the Scriptures, which can be viewed here: https://sketchfab.com/3d-models/cross-of-the-scriptures-clonmacnoise-ireland-e58c309514fb4899b5d98a6ae93d0928 (last accessed 13 December 2021).

2 J. O'Donovan, ed., *Annala Rioghachta Eireann: Annals of the Kingdom of Ireland by the Four Masters* (hereafter, AFM), 6 vols. (Dublin, 1856), 1:42–45.

3 M. Dunlevy, *Dress in Ireland* (New York, 1989); M. Fitzgerald, "Insular Dress in Early Medieval Ireland," in *AngloSaxon Texts and Contexts*, ed. G.R. Owen-Crocker, *Bulletin of the John Rylands University Library of Manchester* 79, no. 3 (1997): 251–61; H.F. Mc Clintock, *Old Irish and Highland Dress* (Dundalk, 1943); J.C. Walker, *An Historical Essay on the Dress of the*

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When it originally appeared in 1999, this paper offered a new perspective on the multivalent iconographies of four figures in elegant costumes on the Cross of the Scriptures at Clonmacnois, County Offaly, in central Ireland. Since then, several scholars have drawn similar conclusions.[4] My argument remains the same, but the earlier version of this essay neglected a central factor which has been much discussed in recent years: polychromy. Eochaidh's system as described in the annals focuses primarily on color, but the relief carvings that appear on the crosses have only been studied by modern scholars in the neutral values of light and shade that play upon the surfaces of the stone. Early medieval audiences, on the other hand, were more likely to encounter colorful imagery on the cross, which would have enhanced the symbolic value of costume in the scenes' iconographies. Many scholars have proposed that the surviving stone Irish crosses were once painted, but no traces of pigment survive, probably due to the exterior location of the monuments and weathering over time.[5]

The absence of physical evidence for pigmentation is not evidence of absence, and as many studies have demonstrated, art historians and archaeologists have sidelined—and sometimes intentionally marginalized—the issue of color for far too long. For instance, the famous early scholar of Greek art, Johann Winckelmann, knew of ancient polychromy hundreds of years ago but set the issue aside to support his contention that sculptural forms should be appreciated free of color.[6] Winckelmann's work is invaluable in many ways, but ignoring the role of color in ancient sculpture resulted in a snowball effect that left medievalists with an incomplete picture of how the reliefs on sculptures

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Ancient and Modern Irish (Dublin, 1818); on dress as a system of nonverbal communication see R. Barthes, "The Garment System," in *Elements of Semiology*, trans. A. Lavers and C. Smith (New York, 1968), 25–28; J.B. Eicher, ed., *Dress and Ethnicity* (Oxford, 1995).

4 Roger Stalley reiterated my point about the multivalence of Irish medieval sculpture in a 2014 essay. R. Stalley, "Irish Sculpture of the Early Tenth Century and the Work of the 'Muiredach Master': Problems of Identification and Meaning," *Proc. Royal Irish Academy* 114C (2014), 1–39. Heather Pulliam has also made a similar argument in her recent essay, "Between the Embodied Eye and the Living World: Clonmacnoise's Cross of the Scriptures," *The Art Bulletin*, 102, no. 2: 7–35.

5 P. Harbison, *The High Crosses of Ireland: An Iconographical and Photographic Survey*, 3 vols. (Bonn, 1992), 5:1, 271, 275, 279, 329, 351.

6 For more on Winckelmann's relationship to polychromed sculpture, see Nell Irvin Painter, *The History of White People* (W.W. Norton & Co, 2010). It wasn't until the 1960s that art historians began to study polychromed sculpture in earnest. For recent work in the area, see Roberta Panzanelli, ed. (with Eike D. Schmidt and Kenneth Lapatin), *The Color of Life: Polychromy in Sculpture from Antiquity to the Present* (Los Angeles, 2008) and Vinzenz Brinkmann, Oliver Primavesi, and Max Hollein, eds, *Circumlitio: The Polychromy of Antique and Mediaeval Sculpture; Proceedings of the Johan David Passavant Colloquium* (Frankfurt am Main, 2008).

like the Cross of the Scriptures functioned in their historical contexts. Such early biases against polychromed sculpture were only exacerbated by the politics of the 20th century. As Jan Stubbe Østergaard has written:

> At universities and in museums, the silent majority of classical archaeologists turned a blind eye to polychromy .... To this one must add the totalitarian ideologies rampant in Europe in the 1920s and 30s: the Roman imperial past glorified by Italian Fascism stood in a blaze of white marble, while in Germany, National Socialism advocated the superiority of the noble, white, Aryan race. In such a political climate, the study of polychromy in classical sculpture was not encouraged.[7]

Disturbingly, such white supremacist views still operate in the 21st century.[8] For this reason, it is essential to remind readers that the Irish high crosses were probably once quite colorful, despite their contemporary stony and lichen-encrusted appearance.

The costumed figures considered here appear in two of the reliefs that adorn the Cross of the Scriptures' east face (Figure 12.1). In the lowermost panel, an individual in a long, richly ornamented tunic and cloak turns to face a bearded man with a shorter garment and a large, Danish type sword[9] (Figure 12.2). A slender cylindrical object that appears to be a staff or vine divides the scene. Both men grasp the central object and step towards it in a gesture of collaboration. In the panel directly above, two bearded figures wear long, close-fitting tunics and cloaks fastened with prominent ring brooches (Figure 12.3). Large swords hang from their belts and they appear to be passing an oblong object between them, a gesture of cooperation similar to the one in the image below.

Despite the precise articulation of these figures' costumes, the scenes' iconography has proved challenging to identify conclusively. Scholars have

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7 Jan Stubbe Østergaard, "Emerging Colors: Roman Sculptural Polychromy Revived," in Panzanelli, ed. (as in n. 5), 40–61 (at 40–42).

8 Sarah Bond, "Whitewashing Ancient Statues: Whiteness, Racism, and Color in the Ancient World," *Forbes Magazine* (27 April 2017). (https://www.forbes.com/sites/drsarahbond/2017/04/27/whitewashing-ancient-statues-whiteness-racism-and-color-in-the-ancient-world/#2206104275ad; accessed 13 December 2021). Maggie M. Williams, "'Celtic' Crosses and the Myth of Whiteness," in A. Albin, M.C. Erler, T. O'Donnell, N.L. Paul and N. Rowe, eds, *Whose Middle Ages?: Teachable Moments for an Ill-Used Past* (New York, 2019).

9 Viking swords were larger and stronger than Irish weapons, and the Irish adopted Viking arms from an early date in order to combat the invaders more effectively. See J. Graham-Campbell and D. Kidd, *The Vikings* (London, 1980), 113–14; L. and M. De Paor, *Early Christian Ireland* (London, 1958), 105.

FIGURE 12.1 Replica of the Cross of the Scriptures at Clonmacnois (East Face), early 10th century
PHOTO: DALYLEO - OWN WORK, CC BY-SA 4.0, WIKIMEDIA COMMONS

argued that they illustrate episodes from the Joseph story, hagiographical anecdotes from the *Life of Saint Ciarán*, or depictions of contemporary historical individuals.[10] The reality is that these two carvings, like many medieval images, resonate on a number of levels, incorporating references to the Bible, the lives

10 The lowermost scene has been identified as Joseph Interpreting the Dream of Pharaoh's Butler, Moses and the Brazen Serpent, Adam and Eve, King Fland Sinna and Abbot Colman Conaillech building a new stone church in the early 10th century, or Diarmait Mac Cerbaill and Saint Ciarán founding the monastery in the 6th century. The two standing figures in the center panel have been identified as the Chief Butler giving the Cup into Pharaoh's Hand, Dermot and MaelMor, Saint Ciarán and Diarmait Mac Cerbaill founding the monastery, and King Fland and Cathal Mac Conchobair (or unknown noblemen or

FIGURE 12.2 Lowermost panel and Inscription on the East Face of the Cross of the Scriptures at Clonmacnois, early 10th century
PHOTO: PETER HARBISON

of the saints, and contemporary politics. They are symbolically sophisticated, and can be understood to signify multiple events and realities simultaneously. Specifically, the figures' attire in these two panels triggers a range of associations that enrich the cross's significance by linking the monastic brethren with the Irish nobility.

As in many areas of early medieval Europe, the boundaries between political and religious institutions in pre-Norman Ireland were highly permeable. Much has been made of the violent encounters between monastic communities, Irish kings, and Viking invaders, but in reality such interactions were subtly nuanced, resulting in alliances that were not consistently destructive but often

chieftains) forging an alliance. For a complete description of these interpretations, see P. Harbison, *The High Crosses of Ireland* (as in n. 4), 49.

FIGURE 12.3 East Face of the Cross of the Scriptures at Clonmacnois, early 10th century
PHOTO: PETER HARBISON

mutually beneficial.[11] On numerous occasions, regional kings interacted with ecclesiastical leaders on both an ideological and a practical level, engaging in an ongoing dialogue about social hierarchy and the characteristics of appropriate rulership.[12] The most powerful members of Irish society orchestrated

11 C. Doherty, "Exchange and Trade in Early Medieval Ireland," *Journal of the Royal Society of Antiquaries of Ireland* 110 (1980): 67–89; P. Holm, "Between Apathy and Antipathy: The Vikings in Irish and Scandinavian History," *Peritia: Journal of the Medieval Academy of Ireland* 8 (1994): 151–69; K. Hughes, *The Church and the World in early Christian Ireland, in Church and Society in Ireland, AD 400–1200*, ed. D. Dumville (London, 1987).

12 Catherine Herbert has argued for the significance of David imagery on the Irish high crosses as one component in "dialogue on rulership between ecclesiastical authorities and their secular patrons." She also points to the similarities in the descriptions of an ideal secular ruler and an ideal abbot as recorded in the 8th-century *Collectio canonum Hibernensis*, and a mid-7th-century tract, *De duodeim abusivis saeculi* (On the Twelve

an equal exchange of access to their respective domains: the monks received land, financial support, and military protection, while the nobles obtained spiritual guidance, the promise of salvation, and the assistance of the clergy as mediators in political disputes.[13]

In each of the two reliefs on the Cross of the Scriptures, the composition evokes an instance of collaboration. The figures' decorated cloaks, prominent weapons, and conspicuous jewelry identify them as high-ranking individuals from both the ecclesiastical and lay arenas. Rather than emphasizing the subjects' particular identities, the sculptors have defined their relationship to one another, highlighting both the inextricable links between the church and the laity and the powerful bonds between secular noblemen. These are wealthy and sophisticated men whose ability to cooperate with one another provided the stable social scaffold that ensured peace and security for the ecclesiastical community and its dependents. The depiction of fine clothing on the Cross of the Scriptures at Clonmacnois acts as a kind of visual analogue for the interactions between lay society and the ecclesiastical world.

2 The Cross of the Scriptures at Clonmacnois

The Cross of the Scriptures, *Cros na Screaptra* in Old Irish, stands amid the ruins of the early Christian monastery of Clonmacnois, once a bustling center of activity.[14] Although *Cluain moccu Nóis* (the meadowland of the descendants of Nóis) was initially founded as a small ascetic colony of nine, the settlement quickly grew to be a large, diverse community. By the time the Cross of the Scriptures was erected, Clonmacnois was a prominent and wealthy proto-town with a population of nearly five hundred souls. Those in orders lived at the center of the site, closest to the relics of the founding saint, where they fostered noble children in the monastic school and welcomed the abandoned, the destitute, and the famine-stricken into their ranks. Archaeological excavations have shown that the sacred core of the monastery was abutted by a village of

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Abuses of the World) by the Pseudo-Cyprian. C. Herbert, *Psalms in Stone: Royalty and Spirituality on Irish High Crosses* (Doctoral Dissertation, University of Delaware, 1997), 273, 287.

13 L.M. Bitel, *Isle of the Saints: Monastic Settlement and Christian Community in Early Ireland* (Ithaca, 1990): 115–28, 149–50.

14 The Cross of the Scriptures takes its name from the annals. See D. Murphy, ed., *The Annals of Clonmacnois: Being the Annals of Ireland from the Earliest Period to A.D. 1408* (hereafter AClon) (Dublin, 1896), 1060 C.E.: 178; AFM 1060 C.E.: 2, 879.

lay tenants who performed most of the agricultural labor that supported the monks in exchange for spiritual guidance and land.[15]

The cross, one of several surviving monuments on the site, is a magnificent monolithic structure made from a single block of sandstone millstone grit, a type of stone found in the mountains some 35 miles away from Clonmacnois. The completed sculpture takes the form of a massive Latin cross with a prominent ring encircling the intersection of its shaft and arms. It measures almost four meters in height. Every surface is adorned with relief carvings including figural scenes and panels of intricate geometric designs. Depictions of Christ in the Tomb, Christ's Arrest, and The Rending of Christ's Garments occupy the west face, while the Traditio Clavium appears above the two scenes under consideration on the east (Figure 12.1). The narrow north and south sides of the cross include a variety of themes, among them David Playing his Lyre, Saint Michael Slaying the Dragon, and A Cleric Plaiting or Cutting Another's Hair. The cross's head is decorated with a Crucifixion on the west side and a Last Judgment on the east, and the base is carved with scenes of chariots and animals.[16]

An inscription has been used to date the monument and has often been cited as confirmation of some of the figures' identities (Figure 12.2). Beginning on the west face and continuing on the east, the inscription has been reconstructed as:

ORDORIGFL.IND MMA
N
ROITDORIGHERENNOR

Pray for Fland, son of Maelsechnaill, prayer for the king of Ireland; prayer …

DOCOLMANDORRO
ANCROSSAAR
RIGFL.ND
… for Colman, who made this cross for King Fland[17]

15 Bitel (as in n. 12), 115–28; C. Doherty, "The Monastic Town in Early Medieval Ireland," in *The Comparative History of Urban Origins in Non-Roman Europe: Ireland, Wales, Denmark, Germany, Poland and Russia from the Ninth to the Thirteenth Century*, ed. H.B. Clark and A. Simms, British Archaeological Reports International Series (Oxford, 1985), 45–69; M. Herity, "The Building and Layout of Early Christian Monasteries before the Year 1000," *Monastic Studies* 14 (1983): 247–84; H. King, "Burials and High Crosses at Clonmacnoise (Ireland)," paper presented at Death and Burial in Medieval Europe: Papers of the 'Medieval Europe Brugge 1997' Conference (Zellik, 1997), 127–31.

16 Harbison, *High Crosses* (as in n. 4), 48–53.

17 Harbison, *High Crosses* (as in n. 4), 356–57.

King Flann or Fland Sinna was a member of the Clann Cholmáin branch of the powerful Uí Néill family, and he defeated Cormac Mac Cuilennáin at the Battle of Belach Mugna in 908. With his victory, Fland solidified his family's hold on the high kingship of Ireland, and he purportedly ruled the country from 877 to 914 C.E. Fland's triumph was a significant accomplishment, as there were approximately 150 regional kings in early medieval Ireland, all vying for positions within the power hierarchy.[18] Fland Sinna's patronage of the Cross of the Scriptures at Clonmacnois was undoubtedly a public statement of his achievement as well as a permanent prayer of thanks for his success. While the inscription clearly designates Fland as the person to whom the cross is dedicated, Colman's role is less certain: he may have been a co-patron, designer, or perhaps even sculptor.[19] He has been identified as Abbot Colman Conaillech (d. *c*.921), a contemporary of King Fland, a discovery that provides an early 10th-century date for the cross.[20] The construction of the monument certainly must have incurred great expense for the transportation of megaliths and the employment of designers, craftsmen, and painters, and the inscription suggests that Fland was largely responsible for the costs. Fland's generosity and connection to Clonmacnois are commemorated eternally in the Cross of the Scriptures, and his patronage also extended to the erection of a new stone church in the same period. According to the *Annals of Clonmacnois*, this architectural project also involved Abbot Colman in some capacity, confirming that the two men pooled their resources on more than one occasion.[21]

3 The Léine and Brat

Each of the four figures on the Cross of the Scriptures is wearing a variation on a type of noble costume known as the *léine* and *brat*. The *léine* was a sleeveless smock-like garment of variable length that was sometimes hooded. It could be made of unbleached or white linen—or silk on rare occasions—and

18 F.J. Byrne, *Irish Kings and High Kings* (New York, 1973), 266.

19 D. Mac Lean, "The Status of the Sculptor in Old-Irish Law and the Evidence of the Crosses," *Peritia* 9 (1995): 125–55.

20 There has been some dispute over the cross's date, but I prefer the early 10th-century timeline, as I discuss below. For an alternative view, see P. Harbison, "The Inscriptions on the Cross of the Scriptures at Clonmacnois, County Offaly," *Proc. Royal Irish Academy* 79: C, no. 7 (1979): 177–88.

21 AClon (as in n. 13), 901 C.E.:144. The *Annals of the Four Masters* confirm the church's construction under the year 904, and the building is explicitly described as a *diamhliag*, or stone church. AFM (as in n. 1): 2, 904 C.E., 571.

sometimes had a decorated hem.[22] This light undergarment was covered by a *brat*, a brightly colored, four-cornered shawl made of wool that could be wrapped around the body and fastened with a brooch.[23] Although the figures' precise identities are virtually irretrievable, their elaborate clothing reveals their elevated status, and their gestures of cooperation communicate the value of their symbiotic relationships.

Literary sources such as the epic tale *Táin Bó Cúailnge* (The Cattle Raid of Cooley) describe elaborately decorated examples of the *léine* and *brat*. In the *Táin*, the fiercest Irish warriors battle one another for possession of the Brown Bull of Cúailnge, believed to be the finest animal in the country. Cattle were a valuable commodity in early medieval Ireland and raids on others' herds were a common occurrence. Several passages in the *Táin* are devoted to describing the noblest Irish warriors arrayed in their most terrifying and impressive garb.[24] While the text does not define a strict one-to-one correlation between costume and rank, it certainly suggests that the *léine* and *brat* denote an individual's nobility and military prowess. On the night before the final conflict of the tale, 20 noble warriors in elegant costumes lead companies of some three thousand men each onto the battlefield. A scout describes their leader, Conchobor, king of the province of Ulster:

> Finest of the princes of the world was he among his troops, in fearsomeness and horror, in battle and in contention. Fair yellow hair he had, curled, well-arranged, ringleted, cut short. His countenance was comely

22 The term *léine* appears quite frequently in the literary sources and the adjective *gel*, meaning bright, is often used to describe it. See C. O'Rahilly, ed. and trans., *Táin Bó Cúailnge from the Book of Leinster*, Irish Texts Society 49 (Dublin, 1967). It appears to be a native word and may derive from a root meaning linen. See Dunlevy (as in n. 2): 15–26; F. Shaw, S.J., "Irish Dress in Pre-Norman Times," in *Old Irish and Highland Dress*, ed. H.F. Me Clintock, 2nd ed. (Dundalk, 1950), 12–13.

23 *Brat* also seems to be a native word, although it is of uncertain derivation. Several synonyms for this type of garment appear in the literature including *fuan*, *lend*, and *lumman*. A *corrthar*—a border or fringe that was woven separately—was sometimes attached to the *brat*. See Shaw (as in n. 21), 12–13.

24 Once a warrior had entered into the fray, he was likely to at least adjust, if not remove, his finery for the duration of the battle. There are references in the *Táin* to soldiers rushing naked into battle, and also to warriors' "battle-harnesses" which apparently consisted of leather protective gear. See T. Kinsella, ed. and trans., *The Táin: From the Irish Epic Táin Bó Cúailnge* (Oxford, 1969), 243. Classical authors also described the Celts fighting in the nude. In the 1st century B.C.E., Diodorus Siculus wrote, "Some of them have iron cuirasses, chain-wrought, but others are satisfied with the armour which Nature has given them and go into battle naked." See C.H. Oldfather, trans., *The Library of History of Diodorus of Sicily*, ed. E.H. Warmington, Loeb Classical Library (Cambridge, MA, 1970 [1939]), 3, 177.

> and clear crimson. An eager grey eye in his head, fierce and awe-inspiring. A forked beard, yellow and curly, on his chin. A purple mantle fringed, five-folded, about him (*fúan corcra corrtharach caeicdiabuil imbi*) and a golden brooch in the mantle over his breast. A pure white, hooded shirt with insertion of red gold he wore next to his white skin (*Léine glégel chulpatach ba dergintluid do dergór fria gelchness*). He carried a white shield ornamented with animal designs in red gold. In one hand he had a gold-hilted, ornamented sword, in the other a broad, grey spear. That warrior took up position at the top of the hill and everyone came to him and his company took their places around him.[25]

In the *Táin*, this type of costume is ascribed to Bronze Age warrior kings; however, most scholars agree that the story was recited orally long before being transcribed in the 8th or 9th century, and the text only survives in manuscripts of 12th-century date.[26] Consequently, although the content of the narrative is believed to be primarily pre-Christian, certain details such as costume may resonate with an early medieval sensibility as much as with Bronze Age tastes.[27] Similarly, the *Annals of the Four Masters*—which describe Eochaidh Eadghadhach's early attempt to regulate fashion—is a 17th-century compilation of sources that range in date from the 8th to the 17th centuries. Both texts illustrate that the *léine* and *brat* was a fashion that survived for thousands of years, becoming increasingly venerable with age. By the 9th or 10th centuries, when the Cross of the Scriptures was carved, the *léine* and *brat* were firmly established as the traditional dress of the ancient Irish warrior kings.

Even though the *léine* and *brat* were not exclusively Irish fashions—in fact, they closely resembled the Roman *tunica* and *sagum*—they certainly differed from the early 10th-century norm, at least for non elites.[28] Around the time that the Cross of the Scriptures was erected, most northern Europeans, including the Scandinavians who had become a permanent fixture in Irish society,

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25 O'Rahilly, *Táin Bó Cúailnge* (as in n. 21), 119, 254.

26 Kinsella, *The Táin* (as in n. 23), IX–XVI.

27 In particular, the frequent references to silk *léinte* (pl.) suggest an early medieval inflection because silk was probably not readily available in Ireland until the 9th or 10th century. Excavations in Dublin revealed imported compound silks, silk tabbies, and gold braids dating to the 10th century. See P. Wallace, "The Archaeology of Viking Dublin," in *The Comparative History of Urban Origins in Non-Roman Europe* (as in n. 15), 103–45 at 135.

28 The *léine* and *brat* may have also gained popularity specifically as an imitation of the Roman *sagum* and *tunica*. When writing in Latin, Irish authors often used the word *tunica* to describe a *léine*-like garment. See Shaw (as in n. 21), 11–18.

wore a type of costume that consisted of a short tunic and breeches.[29] Such attire allowed freedom of movement and provided warmth in colder climes, and it may have been worn by the lower classes in Ireland.

Both written and archaeological evidence confirm that Irish clothing could be dyed many different colors, the most common shades being a dark-brownish yellow: purple or crimson, and green. Mention is also made of black, grey, brown, variegated, and striped costumes.[30] There is no way to confirm whether the costumes depicted in the reliefs were originally painted in these many colors, but Eochaidh Eadghadhach's early sumptuary law (mentioned above) is echoed in early medieval sources. In the 7th- or 8th-century Old Irish law-tract, *Senchus Mór*, the following statute appears:

> According to the rank of each man, from the humblest man to the king, is the clothing of his son. Blay-colored, and yellow, and black, and white clothes are to be worn by the sons of inferior grades; red, and green, and brown clothes by the sons of chieftains; purple and blue clothes by the sons of kings.[31]

The author of this text points out that this system was not always legally monitored, but was nonetheless customary:

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29 Among scholars of Irish art, this style has come to be called the jacket and *truibhas* or *trius*, a word that appears to derive from the Old French *trebus* which is also the origin of the English word trousers. Walker used the term *cota* to describe a shirt that fell to the loins, probably the so-called "jacket." See Walker (as in n. 2), 9. Figures wearing a similar costume also appear in the Book of Kells on folios 200r and 130r, and on the Aghadoe Crozier, but the written sources do not refer to this costume as frequently as they do to the *léine* and *brat*, presumably because it was worn primarily by the lower classes. See also M.M. Williams, "Dressing the Part: Depictions of Noble Costume in Irish High Crosses," in D. Koslin and J. Snyder, eds., *Encountering Medieval Textiles and Dress: Objects, Texts, Images* (New York, 2002).

30 O'Rahilly, *Táin Bó Cúailnge* (as in n. 21). Yellow seems to have been a very popular color, which the Irish may have achieved by using a local plant called *buidh mor* (great yellow) rather than imported saffron. See Walker (as in n. 2), 262. Purple dye also seems to have been made in Ireland. See F. Henry, "A Wooden Hut on lnishkea North, Co. Mayo," *Journal of the Royal Society of Antiquaries of Ireland* 52, no. 2 (1952): 163–78. Additional evidence for brightly colored costumes comes from the illuminated manuscripts of the period, particularly the Book of Kells, Dublin, and also from the archaeological textiles found at Lagore crannog, which might have been dyed red. See L. Start, "Textiles, in Lagore Crannog: An Irish Royal Residence of the Seventh to the Ninth Centuries," H. O'Neill Hencken, *Proc. Royal Irish Academy*, 53C (1950–51): 1–247 at 214.

31 W.N. Hancock and T. O'Mahony, eds., *Ancient Laws of Ireland*, 6 vols. (Dublin, 1865–1901), 2:147–49.

> No book mentions a difference of raiment, or that there should be any difference in their clothes at all. But the custom now is as follows: Satin and scarlet are for the son of the king of Erin, and silver on his scabbards, and brass rings upon his hurling sticks, and tin upon the scabbards of the sons of chieftains of lower rank, and brass rings upon their hurling-sticks ...[32]

The splendor of a nobleman's *léine* and *brat* could be further enhanced through the addition of embroidered details. The exquisite quality of Irish embroidery and the high regard for its makers were well known in this period, as demonstrated by a reference to their value in the Brehon Laws:

> For ornamental work, there is paid to the amount of value of an ounce of silver, for every woman who is an embroideress deserves more profit than even queens.[33]

Jewelry was also a badge of status and wealth. In the center panel on the Cross of the Scriptures, each man's *brat* is held in place by a large (pen)annular brooch on the right shoulder.[34] Many examples of this type of extravagant golden and jeweled Irish brooch have survived, such as the Tara Brooch of *c.*750 C.E., and written and archaeological evidence suggest that the size and intricacy of a person's brooch was commensurate with his rank. The *Senchus Mór* associates:

> ... brooches of gold, having crystal inserted in them, with the sons of the king of Erin, and of the king of a province, and brooches of silver with the sons of the king of a territory, or a great territory; or the son of each king is to have a similar brooch, as to material; but that the ornamentation of all these should appear in that brooch.[35]

Such fine brooches, when used to hold a *brat* in place, were sufficient to indicate elevated status, but written sources like *Senchus Mór*, the *Annals of the Four Masters*, and *Táin Bó Cúailnge* diverge on the precise identification of particular ranks. Indeed, it is unlikely that any sumptuary legislation would

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32 Ibid.

33 Ibid., 5:383

34 The condition of the carving makes it difficult to determine whether these are annular or penannular brooches. Both types are circular, but the penannular variety has a gap in the ring. When the reliefs were painted, it would have been easier to identify the type. S. Youngs, ed., *The Work of Angels: Masterpieces of Celtic Metalwork, 6th–9th Centuries AD* (Austin, 1989), 214–15.

35 Hancock and O'Mahony (as in n. 30), 2:147–49.

have been observed consistently from the Bronze Age through the early Middle Ages, and it is reasonable to assume that custom was often victorious over law. The depictions of fine jewelry and elaborately decorated costumes on the Cross of the Scriptures demonstrate that an elegant *léine* and *brat* clasped with a prominent ring brooch was sufficient to announce an early 10th-century individual's nobility. It is also likely that the cross's original polychromy would have enhanced such symbols of status and rank. What is more, the appearance of these wealthy secular gentlemen on the cross indicates their intimate involvement with the ecclesiastical community at Clonmacnois.

4 Let, O Warrior, Thy Hand Be Over My Hand

In the lowermost panel on the cross's east face, two figures dressed in strikingly different costumes approach a central vertical object (Figure 12.2). The figure on the left wears a richly adorned *léine* and *brat* carved with incised designs representing some combination of needlework decoration and applied gems or cabochons. Although these splendid garments imply that he is of an elevated status, his lack of a weapon and the small pouch draped over his back contrast sharply with the costume of the figure on the right side of the panel, whose shorter tunic, abundant beard, and prominent sword suggest that he is a warrior. This figure may have gathered up his *léine* and belted it, a common style for noblemen engaged in active pursuits.[36]

Most scholars have identified these two personages as a cleric and a warrior.[37] The left-hand figure's hooded *léine* might be a *caputiis* (*cochal*), a cowl-like garment described by Gerald of Wales in 1188 C.E.[38] Gerald's two visits to Ireland centered on religious houses; consequently, the garments he describes were

36 According to the late 12th-century parody of the popular vision-tale genre *Aislinge Meic Conglinne* (The Vision of Mac Conglinne), Anier Mac Conglinne, a famous scholar, pulled his long *léine* up over his belt in order to prepare for his walk from Roscommon to Cork. K. Meyer, ed. and trans., *Aislinge Meic Conglinne: The Vision of Mac Conglinne* (London, 1892). It is possible that the relief depicts a shorter tunic called a *léinte* or *leinidh*, but the extreme variation in Old Irish orthography suggests that all three words are simply alternate spellings for the same garment. See Me Clintock (as in n. 2), 121.

37 Harbison (as in n. 6), 49.

38 J. O'Meara, trans., *Gerald of Wales: The History and Topography of Ireland* (London, 1982 [1951]), 101. On the *cochal*, see Walker (as in n. 4): 12–13. This figure might also be wearing a type of footwear called "soleless stockings." See J.W. Barber, "Some Observations on Early Christian Footwear," *Journal of the County Kildare Archaeological Society* 86, no. 243 (1981): 103–06; A.T. Lucas, "Footwear in Ireland," *The Journal of the County Louth Archaeological Society* 13, no. 4 (1956): 309–94.

probably worn mainly by men of the church. In addition, the small bag that the figure carries resembles a book satchel similar to the 15th-century example that is now associated with the Book of Armagh.[39] And, finally, his cropped hair and clean-shaven face may be the attributes of a cleric. Not only were appropriate methods of tonsure the topic of heated debates in early medieval Ireland, but a panel on the north side of the cross also depicts a cleric either cutting or braiding an abbot's or bishop's hair.[40]

The juxtaposition of a heavily armed soldier and a finely dressed churchman in this scene may initially seem incongruous; however, their gesture of cooperation sends a clear message. Both men grasp the central staff in a collaborative act whose significance is articulated through the alternating pattern of their hands. Whatever the iconography of this image, it functions as powerful reference to the shared responsibilities of a warrior king and an ecclesiastical leader in sponsoring and maintaining the community at Clonmacnois.

Some scholars have suggested that this relief represents King Fland and Abbot Colman erecting the new stone church in the early 10th century. Although both figures grasp the central vertical object and lean towards it in an apparent effort to thrust it into the ground below, it does not resemble any familiar component of a stone structure. Not only does the object appear to be excessively tall and thin, but a serpent-like thread also winds around it, possibly lending credence to those who argue for a biblical interpretation of the scene. Roger Stalley has proposed that the spiraling form represents the Brazen Serpent, while Peter Harbison argues that the scene and its companion in the panel above are episodes from the Joseph story.[41]

As several writers have pointed out, the central object resembles a wooden post, a key element in another instance of reciprocity between a Clonmacnois supervisor and a lay ruler. According to the *Life of Saint Ciarán*, a future high-king named Diarmait Mac Cerbaill (d. 565) helped the saint to erect the first post of his wooden church in the 6th century. At the time, Diarmait, a distant ancestor of Fland Sinna, was a fugitive from the reigning high king, Tuathal Maelgarb. Diarmait provided his services in the form of physical labor—or perhaps financial assistance, represented metaphorically as brute work—and

39 Although the satchel has been linked to the Book of Armagh, it probably originally held a larger object. See M. Ryan, ed., *Treasures of Ireland: Irish Art 3000 B.C.–1500 A.D.* (Dublin, 1983), 178–79.

40 M. Walsh and D. Ó'Cróinín, eds., *Cummian's Letter "De controuersia paschali" and the "De ratione conputandi,"* Studies and Texts 86 (Toronto, 1988).

41 Harbison (as in n. 4): 202–04; R. Stalley, "European Art and the Irish High Crosses," in *Ireland and Europe in the Middle Ages: Selected Essays on Architecture and Sculpture* (London, 1994), 261–84.

he was rewarded by being appointed Tuathal's successor. Saint Ciarán declared his intention to reciprocate by saying, "Let, O Warrior, thy hand be over my hand, and thou shalt be in sovranty over the men of Ireland."[42] Whether or not Ciarán had any tangible effect on the outcome of the political situation, the implication is that Diarmait's generosity toward the saint was ultimately responsible for his success: each man summoned his most valuable resources to aid the other, and the result was an alliance that benefited both parties.

The dual impact of Ciarán and Diarmait's agreement is analogous to the multivalence of the image itself. Both the appearance of the central post and the hand-over-hand gesture recall their 6th-century pact. At the same time, the juxtaposition of the panel with the inscription that names Abbot Colman suggests a direct relationship between word and image, linking the scene with contemporary events. Diarmait's genealogical link to Fland Sinna confirms the typological connection between the two episodes. ln addition, the serpentine form that winds its way around the post contributes a biblical dimension to the carving. In fact, all of these tales and associations are encoded in the image and revealed through the figures' elaborate attire: the scene recalls Old Testament types and familiar legends, while simultaneously depicting the symbiotic relationship between contemporary noblemen and high-ranking ecclesiastics.

The central panel on the east face of the shaft has proved equally challenging to identify (Figure 12.3). In this image, two figures pass an unidentified object between them, a gesture that has been interpreted as representative of sealing a pact.[43] Some scholars have suggested that these two figures are Ciarán and Diarmait formulating their agreement, while others have proposed that they are King Fland and his former enemy Cathal Mac Conchobair, king of Connacht, who negotiated a peace treaty around 900 C.E.[44] The *Annals of the Four Masters* report: "A meeting at Ath-Luain (Athlone, near Clonmacnois) between Fland, son of Maelseachlainn, and Cathal, son of Conchobhar; and Cathal came into the house of Fland under the protection of the clergy of Ciarán, so that he was afterwards obedient to the king."[45]

As in the image below, the precise identification of these two warrior kings is subordinated to their gesture of friendship. Their static, frontal poses suggest that they are not currently fulfilling their duties as warriors, despite their

42 W. Stokes, ed. and trans., *Lives of the Saints from the Book of Lismore* (New York, 1989 [1890]), 276.

43 C. Neuman de Vegvar has suggested that the object could be a drinking horn, "Drinking Horns and Social Discourse in Early Medieval Britain and Ireland" (New York: Columbia University's Medieval Seminar, 1997).

44 Harbison (as in n. 4), 49.

45 AFM (as in n. 1), 1, 900 C.E., 554.

readiness for battle. They are wise and ethical leaders who seem to be involved in the business of political decision-making, but they keep their weapons close at hand to demonstrate their potential for military prowess. They may be formulating a peace pact, such as that reached between Fland Sinna and Cathal Mac Conchobair, and their gesture of exchange may symbolize the accord. What is more, their treaty may have been achieved with the assistance of an ecclesiastical negotiator, as was the case with Fland and Cathal. If so, this image recalls the constant presence of the church in lay affairs, even if her representatives are not visible.

Although this relief cannot be conclusively identified as a portrait of specific patrons, it may be a generalizing depiction of members of the same rank or kin group. Their ornate brooches declare their nobility, and their long moustaches, plaited and forked beards, and prominent weapons are the attributes of secular individuals. The image certainly serves to pay homage to the wealthy and powerful laymen who protected and financed the monastery, whose family members might be in orders or in fosterage there, and who were probably also responsible for funding the cross itself.

The location of these two panels on the cross's shaft is also significant. A third panel depicting the Traditio Clavium appears immediately above them, and the Last Judgment is carved on the head (Figure 12.1). The Traditio Clavium, in which Christ passes the keys to Peter on his right and the law to Paul on his left, evokes the related themes of the delegation of authority and the collective duties of leadership. As Christ hands the key to Peter, he consecrates the saint as the head of the church, and the implied transfer of authority resonates with the power negotiations in the two images below. Just as Christ had to rely on his earthly servants to maintain his church, so the supervisors at Clonmacnois must turn to their neighbors in the secular realm to assist in the government and support of the ecclesiastical community.

On the head of the cross, atop all three reliefs, is an image of the Last Judgment. The alignment of this carving with the other three suggests that the laity's positive relationship with Clonmacnois will continue to bear fruit even in the afterlife. In the Last Judgment image, Christ appears holding a Latin cross and a tau-shaped staff against his chest. As Peter Harbison has perceptively noted, the staff or scepter could be a judicial attribute, but it could also refer to Christ's eternal priesthood.[46] Christ stands erect, with his head raised, as the dove of the Holy Spirit hovers above; he is victorious over death as confirmed by the cross he holds, a symbol of his resurrection. This impressive

46 Harbison (as in n. 4), 297–300.

personage passes judgment on the tiny figures who march along the cross's arms to his left and his right: those to his left are being herded along by a gruesomely deformed demon, while those to his right are being ushered towards him by a trumpeting angel. The absence of Michael weighing the souls in this depiction of the Judgment Day emphasizes Christ's sole responsibility for making the ultimate decision about the destiny of an individual's soul.[47]

The association of the Judgment scene with images of living noblemen and an ecclesiastic emphasizes the practical role of the scriptures in the lives of earthly men. King Fland Sinna and his contemporaries are the individuals who will be judged and, like Christ who is depicted ascending into Heaven on the capstone, they will ultimately be saved and welcomed into the celestial community. The carvings on the Cross of the Scriptures visually include the laity in Christian history, welcome them into the Clonmacnois community, and proclaim the importance of the mutually beneficial alliances between the sacred and secular realms.

5 The Sacred, the Secular, and the Depiction of Contemporary Costume

Despite centuries of exposure to wind, rain, and encrustations of lichens, the stone carvings that adorn the surfaces of the Cross of the Scriptures at Clonmacnois remain discernible. In fact, in some cases, the decorative details of particular garments can still be seen clearly, indicating that the sculpture must have been rendered with extraordinary precision. Moreover, the reliefs were likely picked out in color originally, enhancing their ability to convey specific symbolic meanings through costume. The meticulous portrayal of the *léine* and *brat* on the Cross of the Scriptures is not simply an illustration of the artists' interest in representing the visual world and the types of clothing that contemporary individuals wore. Rather, the sculpted garments provide visual clues to the figures' identities, ranks, and occupations as well as the scenes' significance. What is more, the profound signifying potential of fashion in ancient and early medieval Ireland is echoed in these relief carvings, where the figures' garments trigger a whole series of associations, from the biblical to the hagiographical to the contemporary.

47 On the depiction of the Last Judgment and its variations in the Irish High Crosses, see K. Veelenturf, *Dia Bratha: Eschatological Theophanies and Irish High Crosses* (Amsterdam, 1997).

In both panels, figures wearing elaborately decorated costumes interact with one another, coming together in acts of cooperation. Although conflicts undoubtedly arose, Clonmacnois's financial and political success was predicated upon her ability to maintain a level of congeniality in dealings with lay neighbors. The relief carvings on the Cross of the Scriptures illustrate ideal examples of ecclesiastical–lay collaboration in a permanent, public forum.

The use of the vernacular in the cross's commemorative inscriptions constitutes the ultimate proclamation of the indispensable bonds between the church and the world. The native language of the laity is literally inscribed on these immutable, public monuments: where Latin, the formal language of the church, would seem a more likely choice. The juxtaposition of fundamentally Christian imagery with depictions of secular costume parallels the interlacing of ecclesiastical and lay culture in this period, and the inclusion of vernacular inscriptions emphasizes the essential interconnectedness of the two realms. Just as actual sacred and secular leaders were interacting in sociopolitical circles, their carved likenesses were encountering one another on the surfaces of the high crosses. Indeed, the scenes simultaneously echo real-life reciprocities and promote the value of such alliances: they constitute a celebration of Clonmacnois's success—and especially Fland's and Colman's contributions—as well as a reminder that such relationships must remain under constant surveillance lest they, like the cross itself, begin to erode.

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CHAPTER 13

To Sea and Be Seen: Reconstruction of the Strategic Building Program at Maillezais Abbey

Mickey Abel

Located on the western coast of France, situated midway between Nantes and Bordeaux, the Anse de l'Aiguillon, known as the Golfe des Pictons in the Middle Ages, is today a relatively small and shallow bay. This coastal area would, however, have looked quite different in the 9th and 10th centuries, when the gulf waters and marshlands extended inland at least 40km from the present coastline (Figure 13.1).[1] Fed by six significant rivers—the Mignon, the Curé, the Lay, the Vendée, the Sevre and the Autize—this ancient body of water would have provided deep and unobstructed access to several inland ports (Figure 13.2).[2] While much of the bay has today been drained by way of an elaborate systems of dykes, levies, locks, and canals, a recent program of electronic mapping of the gulf region shows that many of the components of the aquatic system were likely initiated in the Middle Ages under the auspices of the monks at the Abbey of Maillezais (Figure 13.3).[3] This new evidence suggests that the goal

1 Yves Le Quellec, *Petite histoire du marais poitvin* (La Crèche, 1998), 5–15; and Nicolas Delahaye, *Histoire de la Vendée des origins à nos jours* (Cholet, 2003), 6–12.

2 Nicolas Faucherre, "Topographie médiévale de l'île de Maillezais, La capture de l'Autize," in *L'abbaye de Maillezais: Des moines de marais aux soldats huguenots*, ed. Cécile Treffort and Mathias Tranchant (Rennes, 2005), 179–86.

3 Mickey Abel, "Defining a New Coast: G.I.S. Reconstruction of Maillezais Abbey's Hydraulic Drainage Program and the Coastline it Created," Special Volume: The Interdisciplinary Field Experience: Maillezais Abbey, Water, Technology, and Team Research, Mickey Abel ed. *Perigrinations* 5/3 (2016), 12–53. This history is somewhat obscured by the work of modern historians of the Cistercian order who highlight a period in the history of the gulf, beginning in 1180, when the white monks occupied at least three monastic properties in the gulf region and began to drain the gulf. See Jean-Luc Sarrazin, "Les Cisterciens et la genèse du marais poitevin (France) (vers 1180–vers 1250)," in *L'hyraulique monastique: milieu, réseaux, usages*, Leon Pressouyre and Paul Benoit, eds. (Grane, 1996), pp. 111–119; and Jean-Luc Sarrazin, "Le sel et l'aménagement du littoral Poitevin (XIIIe s.-début XVIe s.," *Les sociétés littorales de Centre-Ouest atlantique: de la préhistoire à nos jours: actes de colloque, Centre international de la mer, Rochefort*, 5/5-6 (1998), 143–161. Jean-Luc Sarrazin, "Maillezais et la mise en valeur des marais au Moyen Âge," in *L'abbaye de Maillezais: Des moines de marais aux soldats huguenots*, Cécile Treffort and Matias Tranchant eds., (Rennes, 2005), pp. 365–66, suggests that even as the Cistercians were building their own water infrastructure, by the thirteenth

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FIGURE 13.1 Map of Gulf of Picton and modern coastline. After public map (Musée de Chateau Niort, Niort, France)

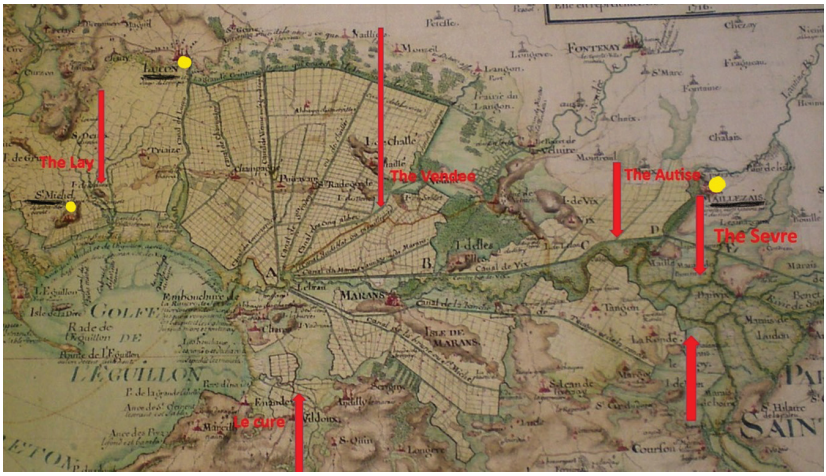

FIGURE 13.2 Gulf of Picton with six rivers. After Claude Mass, *c.*1700

century the land within the gulf had already been drained enough to cause the coastline to begin to shift westward. For Cistercian hydraulics, see Karine Berthier and Josephine Rouillard, "Nouvelles Recherches sur l'hydraulique Cistercienne en Bourgogne, Champagne et Franche-Comté," *Archéologie Médiévale*, 28 (1999), 121–147. Faucherre, "Topographie," pp. 197–98, dates the Cistercian work in the Vendée to the period between 1180 and 1283. The six Cistercian abbeys responsible for this later work were La Grâce-Dieu, Notre-Dame de Char-

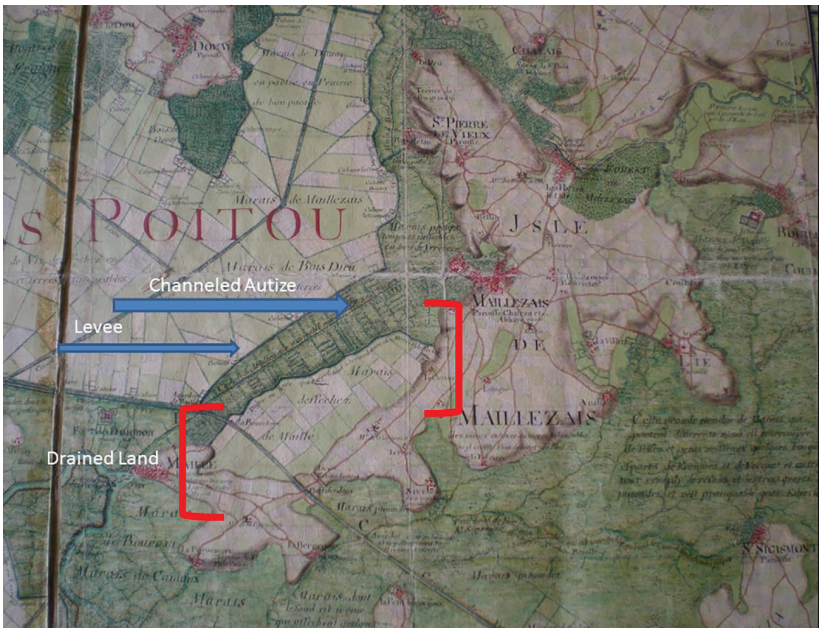

FIGURE 13.3 Maillezais Island, early infrastructure highlighted. After Claude Masse, *c.*1700

in building the coastal infrastructure was to change dramatically the region's topography, as it drained portions of the once salty marshlands to increase the usable landmass. Archaeologists and cultural geographers tell us that the building and management of an infrastructure system such as that in the Golfe des Pictons generally signals a lucrative means of control over the movement of both people and commodities.[4] As such, it represents a tangible avenue for political and economic power. Combining this notion with the physical remnants, it seems clear that the system within the gulf was also designed to facilitate maritime commerce and enhance regional security by establishing

ron, Saint-Léonard-de-la-Chaume, Moreilles and Trizay. Slightly later (1217), four Benedictine abbeys—Saint-Michel-en-l'Herm, l'Absie, Saint-Maixent, Nieul-sur-l'Autise–join forces with Maillezais to construct the "L'Achenal des Cinq-Abbés." In similar manner to the work on Cistercian architecture and hydraulic infrastructure, the study of Villard de Honnencourt's portfolio (ca.1225–1235) illustrates the advancement of the technology developed in the earlier period attended to in the present study. For the bibliography on Villard, I refer the reader to other articles within this volume.

4 Roberta Magnusson, *Water Technology in the Middle Ages* (Baltimore, 2001), 5, notes that these invasions destroyed much of what was left of the Roman water systems. See also, John Blair, *Waterways and Canal-Building in Medieval England* (Oxford, 2007).

defensible ports of entry that could be used both to raise revenue by way of tariffs and taxes and to combat the persistent raids that had plagued the area into the 10th century.[5]

The compelling questions underlying this particular study of the early development of Maillezais's system of infrastructure and its political and economic ramifications are these: How would those who actually built and used the system—the inhabitants of the region—have understood the power dynamics at play in its construction? How would the system have impacted their lives, i.e., what evidence of its benefits would they have been aware of? And finally, how would those who held authority over the infrastructure have justified the expenditures necessary for its construction, as well as the revenues generated in its use? Importantly, the answers to these questions, I suggest, lie not just in the historical documents or in the archaeological analysis of the infrastructure itself, which I have explored elsewhere,[6] but also in a contextual reading of the purposeful employment of strategic topography, the incorporation of communally understood architectural forms, as well as the ritualized performances that would have enlivened the spaces and places encompassed by the aquatic system.

Employing Maillezais Abbey (Figure 13.4) as a case study for this type of multidimensional analysis, this paper argues that Maillezais's sacred architecture, its dramatic siting, and its recognizable points of entry each played an equally meaningful role in the production of power supported by and reiterated in the underlying infrastructure. Focusing specifically on the abbey's location on an island in the Golfe des Pictons (Figure 13.5), the building of the church's highly visible narthex/tower and western façade, and the regional significance of this building's portal configuration, there are three key factors underlying my argument. First is the recognition that the architectural program at Maillezais was built contemporaneously to the early construction phases of the hydraulic system. Second, the abbey's massive narthex-tower, which was purposefully oriented to face out toward the open sea, extraordinarily was added in 1080 to the only recently finished relocation of the abbey's church (*c.*1070). And finally,

5 Yves Le Quellec, *Le Marais poitevin des Deux-Sèvres* (Fontenay, 1998), 7–10; Faucherre, "Topographie," 186–97; and *La fondation de l'abbaye de Maillezais: Récit de moine Pierre*, ed. and trans. George Pon and Yves Chauvin (LaRoche-sur-Yon, 2001), 30–31.

6 See Mickey Abel, "Water as the Philosophical and Organizational Basis for an 'Urban' Community Plan: The Case of Maillezais Abbey," in *Medieval Urban Planning: The Monastery and Beyond*, ed. Mickey Abel (Newcastle upon Tyne, 2017); Abel, "Defining a New Coast" and Mickey Abel, "Emma of Blois as Arbiter of Peace and the Politics of Patronage," in *Reassessing the Roles of Women as 'Makers' of Medieval Art and Architecture*, ed. Therese Martin (Leiden, 2012), 823–61.

FIGURE 13.4 Maillezais Abbey: west façade

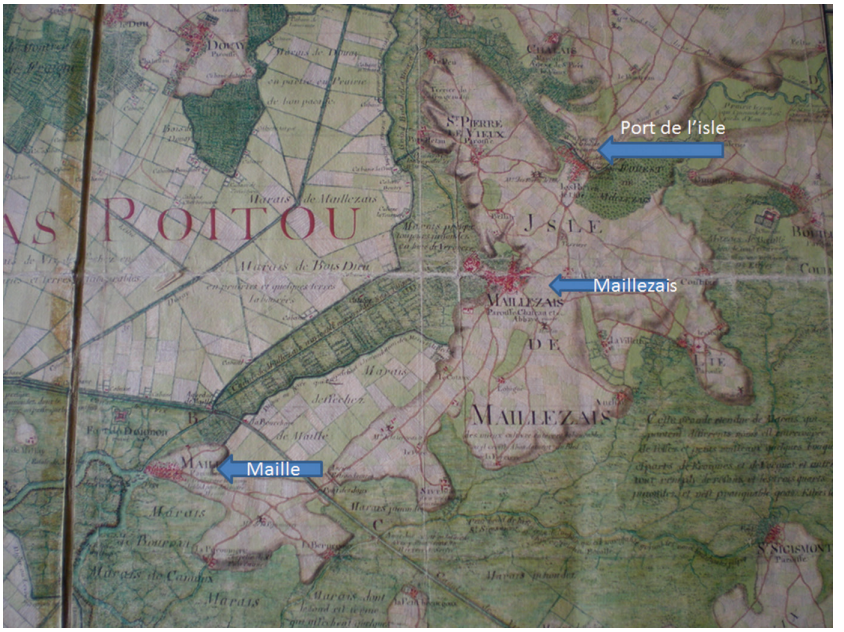

FIGURE 13.5 Maillezais Island with abbey locations. After Claude Masse, *c.*1700

the church's new façade was configured in such a way as to support a specific type of portal opening meant to enhance the spiritual meaning of ascension entailed in the kinetic act of entry. Signaled in movement up a set of stairs to reach an elevated platform, and compounded by the arched formation that served to funnel and propel the participant forward through the opening, this transcendental understanding becomes equated with the physical transition from the tangible reality of the exterior world into the sacred interior.[7] With these underlying factors, I suggest that a more fulsome understanding of the regional power dynamics can be discovered with better visualization of the abbey's western configuration and façade elevation. This is made possible by way of a set of reconstructive drawings that clarify the ways in which Maillezais's siting and physical structure worked in collaboration with the more tangible, real-world aspects of the infrastructure. In the harnessing of the perceptions of the viewing public and shaping the community's understanding of the prevailing ideologies, both architecture and infrastructure contributed to the creation of a regionally recognizable identity.

Founded in the late 10th century by Duke William IV of Aquitaine and his wife, Emma of Blois, Maillezais Abbey was originally situated on an island located at the easternmost end of the gulf between the inland headwaters of the Sèvre and Autize Rivers (see Figure 13.1). We know of the abbey's participation in the area's politics from a variety of sources that illustrate the symbiotic power relationship that developed over the course of the 11th and 12th centuries between the successive dukes of Aquitaine and the abbots of Maillezais.[8] First and foremost amongst these sources is a chronicle written by Peter, a monk of Maillezais, who was commissioned between 1067 and 1072 to record, albeit retroactively, the abbey's late 10th-century founding.[9] Peter's telling of

7 I will come back to this point on spiritual entry. For a more fulsome explanation see, Mickey Abel, *Open Access: Contextualizing the Archivolted Portals of Northern Spain and Western France within the Theology and Politics of Entry* (Newcastle-upon-Tyne, 2012).

8 Sylvie Refalo, "Les ducs d'Aquitaine et l'abbaye de Maillezais (vers 970–vers 1100)," in *L'abbaye de Maillezais:Des moines de marais aux soldats huguenots*, ed. Cécile Treffort and Mathias Tranchant (Rennes, 2005), 319–42. For the history of nobility in Aquitaine, see Jane Martindale, *Status, Authority and Regional Power: Aquitaine and France, 9th to 12th Centuries* (Aldershot, 1997); and Alfred Richard, *Histoire des Comtes de Poitou, 778–1204* (Paris, 1903).

9 Peter of Maillezais (Petru Malleacensis), *De antiquitate et commutation in melius Mallaecensis insulae et translatione corporis sancti Rigomeri*, 1.2 ed. Migne, *PL*, 146, 1247–72 and Peter of Maillezais, *La fondation de l'abbaye de Maillezais*, Liber II (fol. 252 a), in *La fondation de l'abbaye de Maillezais: Récit de moine Pierre*, ed. George Pon and Yves Chauvin (LaRoche-sur-Yon, 2001), 90–169. See also the translations by Charles Arnauld, *Histoire de Maillezais* (Niort, 1840); and J.-L. Lacurie, *Histoire de l'abbaye de Maillezais depuis sa fondation jusqu'à nos jours* (Fontenay-le-Comte, 1852); as well as Édina Bozóky, "La Légend de fondation de Maillezais," in *L'abbaye de Maillezais: Des moines de marais aux soldats huguenots*, ed. Cécile Treffort and Mathias Tranchant (Rennes, 2005), 17–29.

the story links the sacred foundation of the abbey to the political agenda of both the secular nobility and the contemporary abbot. He begins the propagandistic promotion of the abbey with a description of the wild and formidable landscape of the island—also named Maillezais—and a hunting lodge built there two generations prior.[10] He tells us that after Duke William IV married Emma of Blois, he took his new wife to the island to hunt. Seeing a wild boar run into an abandoned chapel and install itself under the altar, Emma was miraculously inspired to found an abbey on this site, indicated by Peter as being near the port of the island (see Figure 13.5). We know that this sort of wild setting is a common trope in foundation legends,[11] but as "stage-setting," it is particularly relevant here in light of the fact that the chronicle was commissioned by Goderan, the contemporaneously appointed abbot of Maillezais, who had been brought from Cluny in 1060 to reform—or tame—the abbey's community of monks.[12] It also can be said to foretell the abbey's subsequent role in the "taming" of the landscape.

There are two other aspects of Peter's story that contribute to our understanding of Maillezais's physical setting and its geopolitical placement. We know that the marriage between William IV and Emma represented a political alliance meant to soothe long-standing tensions between the counties of Blois and Poitou.[13] It is important to note here that the original abbey founded by this couple was purposefully located within the gulf region in order to fill a gap in the indefensible 'no-man's land' between the two counties. Moreover, William's uncle, Elbes, was then abbot at the monastery of Saint-Michel-en-l'Herm (see Figure 13.1), which was one of two older sacred institutions situated much further out in the ancient gulf on what would have been the westernmost frontier of the duke's territory.[14] As abbot, Elbes would have been a first-hand witness to the defenseless state of the open gulf in the face of the

10 Lucien-Jean Bord, *Maillezais: Historie d'une Abbaye et d'un Éveché* (Paris, 2007), 71–72, states that this hunting lodge was built as an *aula* or hall, and that William and Emma transformed it into a fortified *oppidum*.

11 Amy Remensnyder, *Remembering Kings Past: Monastic Foundation Legends in Medieval Southern France* (Ithaca, 1995); and Stephen White, *Re-thinking Kingship and Feudalism in Early Medieval Europe* (Burlington, 2005), 206.

12 Louis Halphen, "L'histoire de Maillezais du moine Pierre," *Revue historique*, XCLX (sic) (1908), 292–97; and Guy Oury, "La reconstruction monastique dans l'ouest: L'abbé Gausbert de Saint-Julien de Tours (v. 990–1007)," *Revue Mabillon*, 54 (1964): 69–124.

13 Thomas Head, "The Development of the Peace of God in Aquitaine (960–1005)," *Speculum* (1999): 656–86, especially 671–73; Michel Dupont, "Monographie du Cartulaire de Bourgueil," *Mémoires de la Société Archéoloogique de Touraine* 56 (1962), 161–62; and Oury, "La reconstruction," 82–83.

14 Delahaye, *Histoire*, 33–35.

marauding waves of Bretons, Normans, Vikings, and Saracens.[15] Both Saint-Michel and the abbey at Luçon, on the gulf's northern shore, were pillaged and burned in 853 and continued to be attacked throughout the 10th century by these same groups. Elbes would certainly have conveyed his insights on this situation to his nephew. The original siting of Maillezais can thus be seen as consistent with what we know of the duke's political goals, his efforts to form new alliances with his wife's family, and his long-standing concerns for the security of his own domain.

Tellingly, however, the chronicle goes on to suggest an outline for the very early transformation of the marshy landscape through the development of a hydraulic system to be built and managed by Maillezais's abbot and monks.[16] Peter's literary description provides us with a sense of the watery state of the surrounding landscape, thus invoking a biblical vision of Maillezais as the sequestered seclusion associated with Saint John on the island of Patmos or perhaps Saint Hillary expelling the snakes from the paradisiacal island of Gallinara.[17] For the modern reader, the description brings to mind an image of an aquatic island setting similar to that of Mont-Saint-Michel at high tide. Importantly, however, we are also given a picture of the politics at play, as Maillezais Abbey was empowered by the duke to take control of the local landscape. This control manifested itself in two ways—financially and ideologically.[18]

The economic end of things is perhaps the clearest. In developing the first components of the water system around the abbey, the monks would have created an economic base that was commodity driven. Their building of dams, levies, locks, and the first canals increased the arable land around the abbey and facilitated the lucrative development of fish ponds, salt marshes, and mills

15 Refalo, "Les ducs," 323. See also, Jean Renaud, *Les îles de Vendée face aux Vikings* (Verriéres, 2008).

16 Pon and Chavin, *La foundation*, 34, 113; Rene Crozet, "Maillezais," *Congrés Archéologique de France, La Rochelle* (Orleans, 1956), 80–83; Marie-Thérèse Camus and Yves Bloome, "L'abbatiale Saint-Pierre de Maillezais," *Congrès archéologique de France. 151e session. Vendée* (1993): 161–81; and Thomas Cornec, "L'abbaye Saint-Pierre de Maillezais: L'architecture de l'abbatiale en partie rélévée par l'archéologie," *Bulletin de la Socété Historique et Archéologique des Deux-Sèvres* 7, no. 1 (1999): 85–103.

17 Rosa Dessi, "Images médiévales d'une île saint: Patmos," 281–300; and Cécile Treffort, "Îsles et moines du littoral atlantique entre Loire and Gironde au Moyen Âge," 319–34, both in *Lérins, une île sainte de l'antiquité au Moyen Âge*, ed. Yann Cadou and Michel Lauwers (Turnhout, 2009).

18 Remnants of this early hydraulic system are visible today at Damvix, Arcais, Courdault, Nuaillé, and Marans. See Abel, "Defining a New Coast," 12–53; Edwine Apps, *Maillezais: The Story of a French Abbey* (La Creche, 2002), 46.

for the grinding of grain.[19] Archaeological evidence of each of these components remain within the modern landscape.[20] Similarly, with documentary evidence of the extension of the duke's ban, we know that the monks were also empowered to generate revenue through the taxes placed on the use of the locks and harbors, as well as tariffs on the goods moving from the open gulf through the canals to inland ports (Figure 13.6).[21]

The similarly purposeful manipulation of the ideological understanding of this strategic control of the landscape is, on the other hand, a bit harder to comprehend at this distance in time. But here too, Peter's chronicle provides the basis of our analysis. In emphasizing the moment when Duke William V (r. 1004–30), William and Emma's son, assumed the reins of power, Peter highlights the fact that this transition brought an end to the long period of time consumed by the marital disputes between William's contentious parents. Their vicious sparring and retaliatory withholding of monetary support had repeatedly disrupted the abbey's building program.[22] However, the corollary fact that this couple had also built their primary palace/residence on the same island as the abbey, unusually shifting the comital center of power temporarily

19 Faucherre "Topographie," 186–97. Two important studies that have provided models for my work at Maillezais are Stephen Rippon, "Water and Wetlands in Medieval Estate Management: Glastonbury Abbey, Meare and the Somerset Levels in South West England," in *Ruralia 5: Water Management in Medieval Rural Economy* (Prague, 2005), 93–112; and Chandra Mukerji, *Impossible Engineering: Technology and Territoriality on the Canal du Midi* (Princeton, 2009). In general, I refer the reader to the bibliography on monastic water management detailed in Clark Maines, "Inside the Black Box: The Technology of Medieval Water Management at the Charterhouse of Bourfontaine," *Technology and Culture* 53 (2012): 625–70; Clark Maines, "Sainte-Jean-des-Vignes in Context: The Urban Water Management Systems of Soissons," in *Wasser: Lebensquelle and Bedeutungsträger: Wasserversorgung in Vergangenheit und Gegenwart*, ed. H. Paius, H. Reidel, and P. Winkler (Regensberg, 1999), 15–36; and Paolo Squatriti, ed., *Working with Water in Medieval Europe: Technology and Resource Use* (Leiden, 2000).

20 Abel, "Defining a New Coast," 12–53.

21 Emmanuel Barbier, "Maillezais, du palais ducal au réduit bastionné," in *L'abbaye de Maillezais: Des moines de marais aux soldats huguenots*, ed. Cécile Treffort and Mathias Tranchant (Rennes, 2005), 214–28.

22 Abel, "Emma of Blois," 823–61; Michael Costen and Catherine Oakes, *Romanesque Churches of the Loire and Western France* (Paris 2000), 44–45; Daniel Callahan, "William the Great and the Monasteries of Aquitaine," *Studia monastica*, 19 (1977): 321–42. For the extension of the *bannum*, see Marc Bloch, *Land and Work in Medieval Europe*, trans. J. Anderson (Berkeley, 1967), 136–68; Bernard Bachrach, "Toward a Reappraisal of William the Great, Duke of Aquitaine (995–1030)," *Journal of Medieval History* 5 (1979): 11–21; Alfred Richard, *Histoire des Comtes de Poitou, 778–1204* (Paris, 1903); and Michel Dillange, *Les Comtes de Poitou Ducs d'Aquitaine* (*778–1204*) (Paris, 1995), 153–61.

FIGURE 13.6 Locks on the Sevre River. After Claude Masse, *c.*1700

from Poitiers to the rural setting of the Golfe des Pictons,[23] provided William V a unique opportunity to leave his own, very different, ideological mark on the Maillezais project. In a public act meant to commemorate the contributions of his parents and tie their memory to a spiritual reconciliation, William V donated to the abbey the palace and all of its surrounding domain—the entire island. The donation, however, came with the stipulation that the site of the palace, and perhaps the building itself, be used for the construction of a larger and more strategically oriented church (Figure 13.7).[24] The propagandistic potential of this act lies in the fact that the palace was located on the highest ground at the western front of the island making it the most visible site within the gulf, particularly to those entering the domain from the sea. With his own political

23 Jocelyn Martineau, "Maillezais: Deux cents ans d'archéologie d'ine abbaye fortifée," in *L'abbaye de Maillezais: Des moines de marais aux soldats huguenots*, ed. Cécile Treffort and Mathias Tranchant (Rennes, 2005), 445–60; and Barbier, "Maillezais," 202–03. The arched foundations of this palace can still be seen today under the abbey's south enclosure wall. Archaeologists assume that these openings were used as water-level delivery ports, thereby providing us with an indication of how close the water system was to the abbey and how the abbey had made use of their earliest canals. See Faucherre, "Topographie," 194; and Martineau, "Maillezais," 452–53.

24 Pon and Chauvin, *La foundation*, 34.

FIGURE 13.7 Maillezais foundations—original ducal palace

agenda in mind, William V's stipulated relocation of the abbey thus underhandedly shifted the associations of this region away from his parents, as it enhanced his alliance with the abbot and empowered the abbey to take its place in his strategic control of the gulf. Employing the abbey in this way, William's political role in the region would be filtered through the visual screen of the church; his "control" ceded to a spiritual sanctioning. For the abbey, however, the donation represented a financial coup that would require some spiritual reconciliation of its own in order to justify the real-world gains within the era of church reform.

Unfortunately, our full comprehension of how the monks understood the political value of this relocated church—or even how they "structured" the spiritual coloring of their newly empowered position—is hampered by our inability to adequately visualize the building's original form, particularly the new, prominently situated western façade. While the published acts of a colloquium held in 2002 include the presentation of measured plans of the church produced in 1699 by Claude Masse (Figure 13.8), as well as an accounting of the archaeological work accomplished to date at the site, these excavations illustrate only the skeletal history of what remains of Maillezais Abbey.[25]

25 Yves Suire, Richard Levesque, and Julien Boureau, *La côte et les marais du Bas-Poitou vers 1700: Cartes et mémoires de Claude Masse, Ingénieur du roi* (La Roche-sur-Yon, 2011), 326; and Camus and Bloome, "L'abbatiale, 161–81.

FIGURE 13.8 Maillezais plan. Claude Masse, *c.*1700

The relocated abbey church was begun in circa 1005 and what remains standing is the result of three significant expansions (Figure 13.9). This first church built at the new location was a simple triple-apse basilica that was expanded with an ambulatory and three radial chapels in the period between 1050 and 1070.[26] Important, in terms of this paper, is the building phase between 1080–82, when the newly completed 1070 structure was dramatically reconfigured on the western end with the addition, in a single campaign, of a narthex/porch and tower of unknown height.[27] Finally, in the late 13th century, Gothic transept arms were added along with a new apse and ambulatory

26 The 1005 church has been compared to three others built at the same time in the region: Liez, Brétignolles, and Vouvant. See Yves Bloome, "L'abbaye Saint-Pierre de Maillezais" (Vendee: L'architecture de l'abbatiale en partie revelee par l'archeologie), *Societe historique et scientifique des Deux Severes* (1990), 85–103.

27 Marie-Thèrése Camus, "Imaginer l'abbatiale romane de Maillezais," in *L'abbaye de Maillezais: Des moines de marais aux soldats huguenots*, ed. Cécile Treffort and Mathias Tranchant (Rennes, 2005), 253–68. Marie-Thèrése Camus, "Tours-Porches et function d'accueil dans les églises de Poitou au XIe siècle," in *Avant-Nefs & Espaces d'Accueil dans l'Église: entre le IVe et le XIIe siècle*, ed. Christian Sapin (Bourgogne, 2002), 260–80, references to a fire in 1082, which she feels might have provided the impetus for the remodeling of the western end of the church.

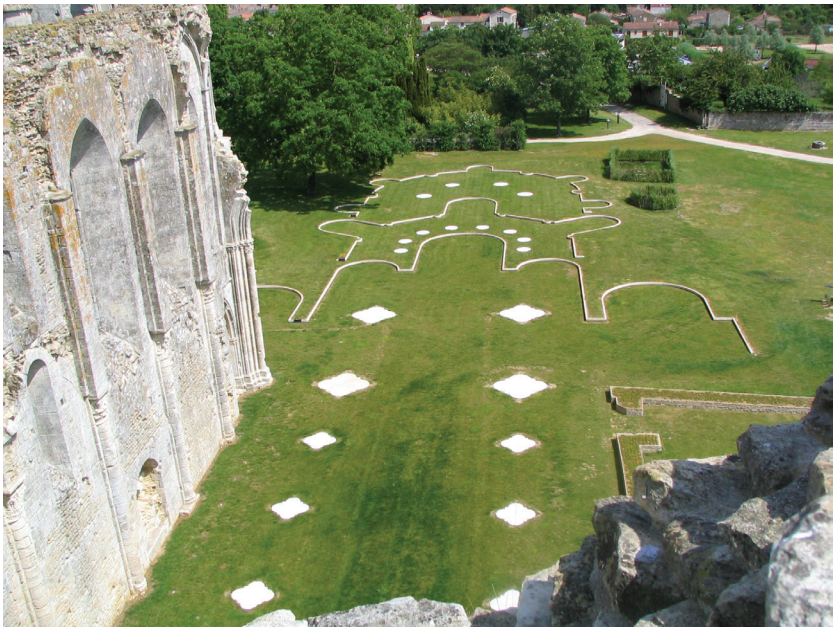

FIGURE 13.9 Maillezais Abbey: nave, view from Tribune

extending the choir to the east.[28] Unfortunately, these later phases obscured much of the 11th-century material of the western end, a process that was exacerbated when the abbey was fortified in the 15th century.[29] This later defensive project included the complete sealing of the narthex, which served to conceal the 1080 western portal and change dramatically the character of the façade. It shifted the outward form of the abbey from what would have been a compellingly open and highly visible site of entry to something meant to resemble a solid blockade designed to deter passage.

Today, even the magnitude of this fortified state is difficult to imagine. Maillezais's current ruinous condition is a result of the early modern quarrying of the building's stone.[30] What was left of the standing structure after two hundred years of deconstruction (1621–1837) was the north and west walls of the northern transept with their Gothic lancet windows; seven bays of the north side aisle wall up to the springers, to include the massive engaged columns that would have supported the vault; the western wall of the original 1070 church, with what would have been its western façade (Figure 13.10); the complete,

28 Camu and Bloome, "L'abbatiale, 275–87.

29 Martineau, "Maillezais," 453.

30 Barbier, "Maillezais," 213–18; Martineau, "Maillezais," 457–61.

FIGURE 13.10 Maillezais Abbey: west façade

albeit enclosed and fortified, narthex with its second story tribune; and two now-truncated stair turrets on the north and south sides of the narthex that would have provided passage to the upper levels of the tower (Figure 13.11).[31] The tribune, which was reconfigured in a later Gothic style, as witnessed in the large rectangular window in the western wall, retains its original round-arched windows on the north and south sides. Most spectacular here is the large opening in the eastern wall of this elevated space, which would have facilitated a dramatic interior view onto the western end of the nave (see Figure 13.9).[32] It is the correlation between this tribune space and the upper levels of the nave and side aisles that has attracted the fascination of previous architectural historians.[33]

31 A full plan is published in Camus and Blomme "L'abbatiale," 164 and 172, where these scholars compare the stair turrets to those at Montierneuf in Poitiers.

32 This tribune opening would have been similar to that at Saint-Savin-sur-Gartempe. See *Saint-Savin: L'abbaye et ses Peintures Murals* (Poitiers, 1999), 70.

33 Camus, "Imaginer," 253–68; and Camus and Bloome, "L'abbaitale," 172, note that the narthex tower, with its impressive stair turrets, appears to have been appended rather abruptly to a simple single story ecran-wall façade that is still visible from the interior of

FIGURE 13.11 Maillezais Abbey: aerial view of western end of nave with stair turret openings

It is, however, the earlier, prefortified status of the narthex beneath this tribune and the now-missing tower above it that is of importance in establishing the abbey's ideological place in the local topography of the 11th century. In light of the extensive changes to the site, the process I undertook in reenvisioning the details of this earlier phase necessitated beginning at ground level with the careful observation of extant details left in the stone, such as indicators of circulation levels, types and sizes of the stone employed, consistency of the masonry coursing, as well as scars left from the removal of earlier ornamentation. After recording these details, an initial plan of the narthex and stair turrets was created by linking the integral measurements physically taken along the interior and exterior walls and their buttressing with the measurements of the wall depth established at the eastern nave opening, as well as the north and south tribune level windows. Diagonal interior measurements verified the right angles at the four interior corners. All aspects of the narthex space were manually measured with a tape except for the thickness of the western wall,

the narthex. For examples of these architectural features, see Marie-Thèrése Camus, "De la façade à tour(s) à la façade-écran dans les pays de l'Ouest: L'exemple de Saint-Jean-de Montierneuf de Poitiers," *Cahiers de Civilisation Médiéval* 34 (1991): 237–53; Camus, "Tours-Porches," 260–80; and Carol Heitz, "Rôle de l'église-porche dans la formation des façades occidentals de nos églises romans," *Cahier de Civilisation Médiévale* 34 (1991): 329–34.

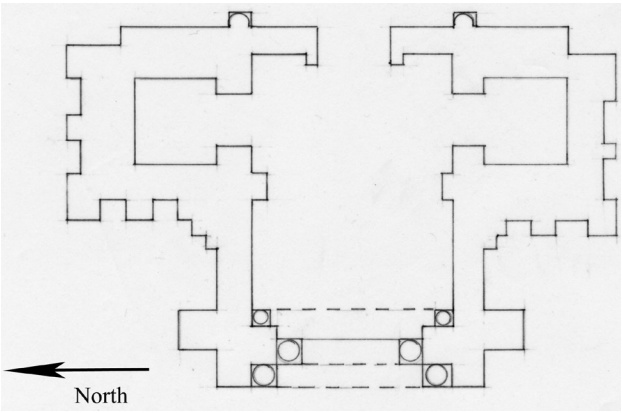

FIGURE 13.12 Maillezais Abbey: portal plan 1

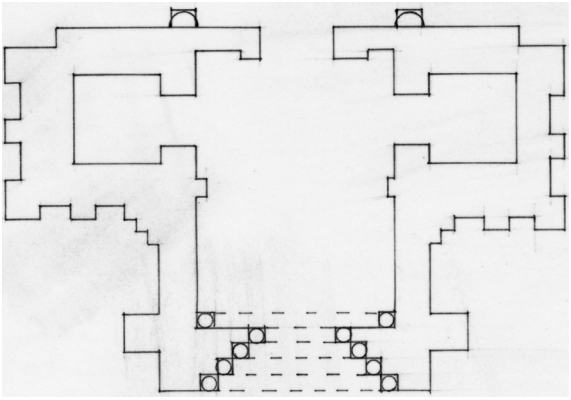

FIGURE 13.13 Maillezais Abbey: portal plan 2

which was obscured by the buttressing added when this end of the building was fortified in the 15th century. The measurement of this interstitial space was, however, easily calculated to be 3.5 m once these manually drawn drafts were recorded and verified with AutoCAD technology.[34] The resulting ground plan was then used as the model for three reconstruction plans of the western portal opening (Figures 13.12, 13.13 and 13.14). These plans were in turn used as the basis for the projection upward of the proposed elevation to include the tower (Figure 13.15).

34 I want to acknowledge the help of then graduate student George Neal in the physical measurement of the western end of the standing ruins in summer 2007 and to Jorge Palos and Mary Stone Lamb for their help with the drawing of plans and the AutoCAD technology.

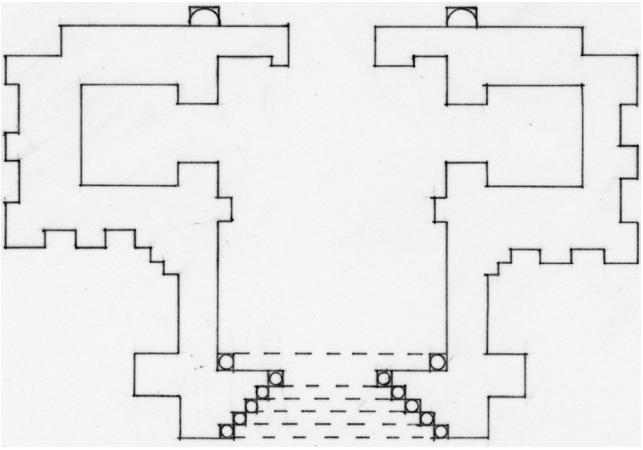

FIGURE 13.14 Maillezais Abbey: portal plan 3

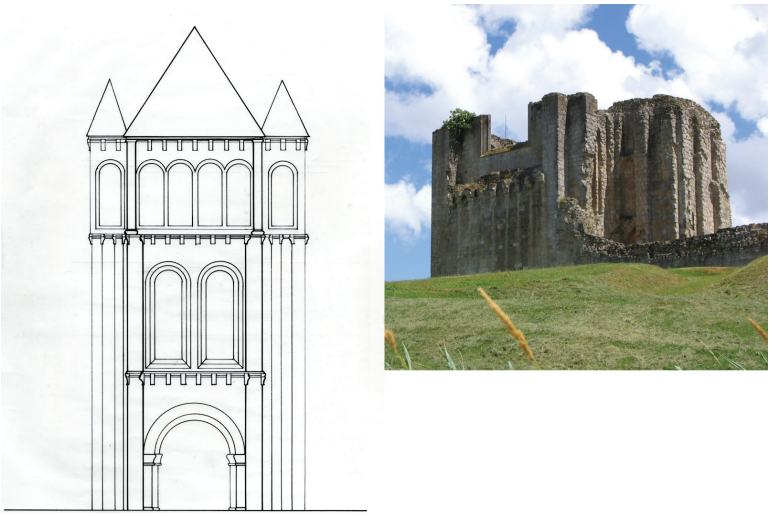

FIGURE 13.15 Present condition of west facade and Maillezais, proposed elevation, reconstruction west facade

Various detail aspects of both the narthex/tower elevation and the three proposed ground plans for the western portal could not, however, be ascertained by way of the extant structure. In order to corroborate this missing detail, comparative analysis based on data gathered from the surrounding Poitou region was used. The first of these observations pertains to the joining of the 1080 narthex/tower to the original 1050–70 façade, which can still be seen under the barrel vault inside the narthex (Figure 13.16). This earlier façade consisted of two blind arches surrounded by sculpted voussoirs to either side of an arched

FIGURE 13.16 Maillezais Abbey: nave entrance from the narthex

opening. When the narthex was added, this central arch became the entry into the nave and would have accommodated at least two steps leading up to the circulation level of that space.[35] Regional comparisons to contemporary façade configurations of the region suggest that the arched configuration of the earlier façade would have resembled extant examples such as that on the north transepts at abbeys at Luçon (Figure 13.17) and Saint-Hilaire-le-Grande in Poitiers, as well as the portals of many small parish churches built in the Poitou region at this time, such as Chillac (Figure 13.18).[36]

As Josclyn Martineau has convincingly illustrated, the new narthex unit, consisting of north, south, and western walls, was simply abutted to the existing façade, allowing this older façade to become the eastern wall at the narthex

35 Camus, "Imaginer," 263; and Tomasz Orlowski, "La façade Romane dans l'Ouest de la France," *Cahiers de la Civilisation Médiévale* 34 (1991): 367–77.

36 Camus and Blomme, "L'abbatiale," 171.

FIGURE 13.17
Maillezais Abbey: Lucon Abbey

FIGURE 13.18
Chillac Parish, Poitou

level.[37] This change can be verified by visual examination of the stone coursing at the northeast and southeast corners of the interior, which shows that the coursing of the original church façade is not integral with that of the new north and south walls. This type of "abutting" construction would have been similar to that employed in the addition of the narthex/tower at Saint-Savin and at Saint-Porchaire in Poitiers, where, on the exterior behind the tower, the remnants of an older façade and its gabled roof remain visible.

The fact that the columns, capitals, and voussoirs of the older façade and portal at Maillezais were left in place to become the decorative entrance into the nave tells us that at the time of the 1080 addition the only slightly older façade type was deemed a valuable architectural asset worthy of incorporation into the new program. It can certainly be argued that maintaining these sculptural elements was economically sensible. Moreover, it does not appear that the space was intended to be remodeled at a later date because at least two other columns with similarly carved figural capitals are visible on the interior of this same narthex space. Interestingly, these columns are found on what becomes the new western wall. With the later (15th C.) fortification project, these two columns and capitals were left somewhat exposed, the wall filled in around them. Although this causes the columns to appear today as if oddly embedded in the wall, they were most likely set originally within reentrant angles as part of the interior elaboration of the new western entry prior to fortification, as indicated on the three reconstruction plans (see Figures 13.12, 13.13 and 13.14). Moreover, there are pedestals for yet two more columns of similar size at the bases of the transverse arch that marks the mid-point of the north and south walls. The cumulative impression of these decorative elements within the narthex was to present a sculptural program intended to integrate the older, original construction with the new more elaborate entrance.

The largest component of this new construction project was the tower, which would have risen above the narthex and tribune. Here too, regional comparisons were helpful in estimating the height of this tower. Initially, however, the clues to this height were found in the analysis of the two stair turrets attached to the north and south sides of the narthex (Figure 13.19). Positioned at the eastern end of the narthex, these two turrets flank and support the body of the narthex/ tribune block. The circular stairs within these units are quite wide (1.4 m) and would have been accessed through two doors on the interior side of the nave's western wall by way of steps that extended to the east, down the side aisles of the nave, rather than from within the antechamber opening

37 Martineau, "Maillezais," 453.

FIGURE 13.19 Maillezais Abbey: south stair turret entry from the north

onto the space of the narthex. Taken together with the width of the stairs, this nave access has been used to suggest that these stair turrets were designed for a use that was both formal and ritualized.[38] However, for the purposes of reconstructing the image of the abbey's western character, the most compelling aspect of the stair turrets is the fact that the stairs within them continue well above the entry to the second story tribune. Another half turn of steps would align with the appropriate north and south entry to a third story space. This makes it clear that the turrets would have extended up at least another level from their now abruptly amputated state to give access to a lost third stage of the narthex/tower.

38 Camus and Bloome, "L'abbatiale," 166.

FIGURE 13.20 Poitiers, Church of Saint Prochaire: west façade and tower

The combination of the proposed height of the tower, access to the stair turrets, and configuration of the narthex has led architectural historians to place Maillezais's western addition in the lineage of avant-nef or gallileias following the model seen at Jumièges or Saint-Germain-des-Prés (990–1014), where a tower extends the space of the narthex and tribune upward.[39] While these familiar sites may well have been contemporary to Maillezais's 1080 remodeling, it is important to note that there are comparable narthex/tower structures in the more immediate region of the Poitou. Relative geography is key to this argument. Compelling models can be found at Saint-Porchaire (1050–80) (Figure 13.20) and Sainte-Radegonde (1012–80) in Poitiers, both located in the nucleus of a region heavily supported by the patronage of the

39 Camus, "Imaginer," 270; Anne Morganstern, *Gothic Tombs of Kinship in France, the Low Countries, and England* (University Park, 2003), 79–96; and Élaine Yvernat, "Paris, Saint-Germain-des-Près," in *Le Paysage Monumental de la France au tout de l'An Mil*, ed. X. Barrall Alet (Paris, 1987), 374–76.

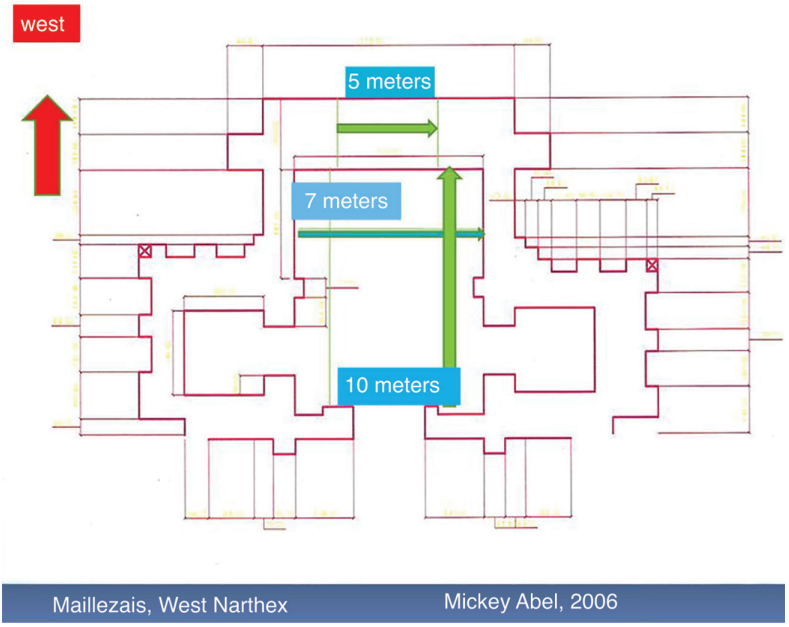

FIGURE 13.21 Maillezais Abbey: AutoCad generated plan

dukes of Aquitaine/counts of Poitou.[40] Like the more rural Maillezais, which was approximately 60 km to the west of Poitiers, Saint-Savin-sur-Gartempe (1030/50), which also had a similar tower, was supported by this same noble family and located a similar distance from Poitiers, although to the east. And while the tower at Saint-Laurent in Parthenay (1080–90) can in some sense be discounted because it was within the domain of a rival lord, it too could be included in this more rural corpus, as it was similarly proximate, situated just 40 km to the north of Maillezais.[41]

In this comparative analysis, the measured plan of Maillezais's extant narthex space (Figure 13.21) shows that its 7 m × 10 m dimensions conform closely to Saint-Savin's 6 m × 9 m, Sainte-Radegonde's 7 m × 8 m, and Saint-Porchaire's

40 Camus, "Tours-Porches," 260–80, places these towers in the same 11th-century "generation," but expands the corpus to include Notre-Dame-le-Grande, Saint-Hilaire, Saint-Nicolas, Saint Paul, Sainte-Croix, Saint-Jean-de-Montierneuf, Saint Maixent, and Charroux. The patronage connection between the monastic institutions of Poitou and the noble women related to the dukes of Aquitaine is explored in Mickey Abel, "Recontextualizing the Context: The Dispute Capital from Saint-Hilaire in Poitiers and Storytelling in the Poitou around the Time of the Peace of God Movement," *Gesta,* 71, no. 1 (2008): 51–66; and Abel, "Emma of Blois," 823–62.

41 Robert Maxwell, *The Art of Medieval Urbanism: Parthenay in Romanesque Aquitaine* (University Park, 2007), 77.

6 m × 8 m size. This ground-level correlation suggests that a similar relationship may have existed in elevation, and perhaps even in the fenestration of the towers. Indeed, each of the comparative towers has the same basic proportional correspondence in the horizontal divisions of their vertical expanse, as well as a similar correlation between the height of these levels and the dimension of the western portal. In each, the decorative unit of the portal is half the height of the first level, but equal to the height of the second level and twice the height of the third.[42] At each of these horizontal divisions the window arrangements multiply in number proportionally to their height—taller and fewer windows at the lower levels of the tower, shorter windows in greater number at the upper floors.

The narthex/towers are primarily related by way of their use. Liturgically, the narthex space within these towers would have had two primary functions; one, as spaces of reception, where guests to the abbey were greeted and could be administered to prior to admittance into the church proper;[43] and two, as funerary/burial spaces, which was indeed the case at Maillezais as evidenced by the tombs that have been excavated within the narthex.[44] In both scenarios, the space would have been understood as liminal, in that it represented a significant transitional zone between the two different realities: the exterior world of secular politics and the interior domain of monastic spirituality.[45]

It is this sense of liminality that is the key to the spiritual understanding of the configuration and function of not only the space of the narthex, but also the portal configuration that adorned its western façade. Completely walled over on the exterior and filled in on the interior as part of the later, 15th-century fortification project, this portal seems not to have caught the imagination of either archaeologists or architectural scholars; there has been little speculation as to its details other than the assumption that as an avant-nef the space surely would have had a point of entry.[46] Considered through the lens of the

42 Orlowski, "La façade," 367–77, suggests a correlation between the tripartite horizontal divisions of these towers as a prelude to the "façade Poitevine."

43 Heitz, "Rôle de l'église-porche," 334; and Jose Luis Senra, "El Torno a las estructuras occdintales de las inglesias Románicas," in *Espacios y estructurios Singulares de edifica Romanico*, ed. P. Huerta (Agular de Campo, 2008), 122–55.

44 Robert Favreau, "Les Inscriptions Médiévale de Maillezais," in *L'abbaye de Maillezais: Des moines de marais aux soldats huguenots*, ed. Cécile Treffort and Mathias Tranchant (Rennes, 2005), 121–34.

45 For work on liminal spaces, see *Thresholds of Medieval Culture: Liminal Spaces*, ed. Elina Gertsman and Jill Stevenson (Woodbridge, 2012); and Victor Turner, *The Ritual Process* (Ithaca, 1969), especially chapter 3, "Liminality and Communitas," 94–130.

46 Camus and Blomme, "L'abbatiale," 166.

liminal function of the narthex, the western façade would, however, have initiated that transition from the outside world and have represented the outward "face" of the monastery. The portal (see proposed elevation, Figure 13.14) would have been not only the most prominent feature of that façade, but the site through which the select were allowed entry. Its "billboard-like" dimensions and directional orientation would have served to signal the identity, character, and concerns of the institution within.[47]

Although the regional tower models considered above had comparably sized portal openings, they are not all that helpful in the visualization of this notion of "identity" or "character." This is because, like Maillezais's portal, each of these comparative portals appears today quite different from what would have been their 11th-century configuration. Subsequent alterations, the addition of later decorative elements, and the accrual of land around them has altered their physical access, their outward appearance and most importantly, their visual effect.[48] One finds that the emphasis on the space of the portal as a distinct liminal zone was not unique to the larger monastic buildings when they look instead to the contemporary parish churches of the region, which remain in abundance (Figures 13.22 and 13.23).[49] As I have argued elsewhere,[50] the essential elements of this portal type, known as the archivolted portal, were the concentrically aligned set of arches, adorned with radially arranged imagery, along with the absence of a tympanum block. Together these elements produced an opening that enhanced and compelled the forward momentum of the viewing devotee through the space of entry. But even in the smaller structures, it is the change in elevation experienced in the steps necessary to bring the devotee up from the outside world to the point of the entry at the threshold that situates and conveys the spirituality of the liminal transition. In many cases the elevation of the building required a significant number of steps. The upward momentum of these steps was accentuated by

47 Mickey Abel, "Before Nationalities: Peace Initiatives and Corporate Identity via the Medieval Parish Church Portal," *Connections: European Studies Annual Review* 1 (2005): 5–11.

48 The portal configuration at Saint-Radegonde has been given Gothic ornamentation; Saint-Porchaire, which now opens directly onto a busy city street, has lost any sense of its original elevation by way of the accretion of buildings and earth around it; and Saint-Savin's tower/narthex are now significantly below ground level, requiring steps down to its portal.

49 Mickey Abel, "Within, Around, Between: The Micro and Macro of Monastic Pilgrimage via the Archivolted Portals of Western France and Northern Spain," *Hispanic Research Journal* 10, no. 5 (2009): 385–416; Anat Tcherikover, *High Romanesque Sculpture in the Duchy of Aquitaine, c.1090–1140* (Oxford 1997); Myriel Boss-Favre, *La Sculpture Figurèe dans Arcs Romans de France* (Zurich, 1987).

50 Abel, *Open Access*, especially 1–34.

FIGURE 13.22
Maille, Parish church

FIGURE 13.23
Maillezais, Parish church

FIGURE 13.24 Maillezais Abbey: west façade, exterior and interior views

a corresponding set of inwardly diminishing, concentric arches mounted on columns that recede into the space between the inner and outer walls of the façade to form the canopy-like, archivolted portal configuration.

At Maillezais, the emphasis on the portal as the first step in a phased transitional movement is signaled initially in the depth of the space between the inner and outer wall of the façade, as indicated on the three ground plans (see Figures 13.12, 13.13 and 13.14). This significance would also have been felt in the dramatic difference in elevation between the ground level outside and the circulation level of the narthex interior (Figure 13.24). At Maillezais the difference today between the circulation level of the interior and the ground level outside is approximately 10 m. This difference is important because it is the elevation of the site that determines the number and height of exterior steps required to reach that point of entry. Likewise, knowledge that the island on which Maillezais was located was essentially a limestone outcropping sitting only 12 m above sea level aides in the visualization of the relative height of this topographical setting and the placement of the church on that island's western front, quite literally rising up from sea level (Figure 13.25).[51] This dramatic siting of the façade, highlighted by the upward ascent of many steps leading to the portal's

51 A modern topographical map verifies Maillezais' present location on an elevated outcropping of limestone. When surrounded by water, this outcropping would have formed an island approximately 8 km by 6 km. Geographers like Faucherre, "Topographie," p. 180,

FIGURE 13.25 Limestone outcropping at base of Maillezais foundations

threshold would have caused the portal opening to appear much more compelling than if it were sitting on flat land, and importantly, would have emphasized the visibility of the abbey's western façade from well out to sea.

While the configuration of the exterior steps remains somewhat speculative because the area has not been fully excavated or electronically scanned, the interior height of Maillezais's threshold can be visually determined. Analysis of the extant ashlar blocks visible on either side of the irregular fill material inserted into the center of the western wall when it was fortified shows that the original interior dimensions of Maillezais's western wall were defined by the height and width of the barrel vault.[52] This vault can still be seen to be carried by the two columns with capitals that were left *in situ* on the western wall when the narthex was enclosed (Figure 13.26). These two columns sit at the level of the fourth course of stone up from the circulation level. Each of these four courses extends in from the corner toward the center of the western wall before they meet the fill material. The ashlar blocks of these courses are consistent with the stone and the coursing of, and integration with, the north and south walls. The second course up from the circulation level plausibly defines the level and the width of the portal threshold, as the stones of this course extend in toward the center only 1 m, leaving a 5 m space at the

extrapolate that this elevated site was indeed one of three islands standing above sea level at the time of the abbey's founding in the tenth century.

52 The vault was raised at a later date. The transverse arch of this more pointed vault rises above the round arch of the barrel vault.

FIGURE 13.26 Maillezais Abbey: northwest corner, interior of narthex

center of the wall for the threshold. This measurement would have been consistent with the portals of the regional narthex/towers, which range in width from 3.5 m to 5 m. Arguably, the largest width is most likely since the narthex at Maillezais is larger than the others in the comparison group. At this level, the threshold would have been 1.4 m above the interior circulation level. As seen today at Saint-Savin, Sainte-Radegonde, and known archaeologically at Notre-Dame-le-Grande in Poitiers, the difference in the height of the threshold relative to the circulation level of the narthex is accommodated by a set of steps within the interior to bring the visitor down into the interior space.[53] These interior steps would have added emphasis to the transitional quality of the movement from the outside world into the spiritual space. The fact that the narthex circulation level is below that of the nave means that there were also steps leading from the narthex up into the space of the nave. These steps

53 Camus, "Imaginer," 253–67; and Claude Andrault-Schmitt and Marie-Thèrése Camus, *Notre-Dame-la-Grande: l'oeuvre romane* (Poitiers, 2002), 104, 130.

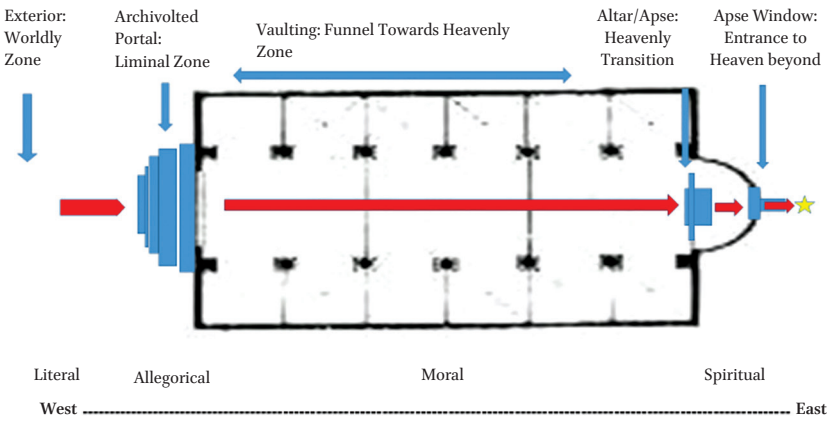

FIGURE 13.27 Exegetical plan of church
AUTHOR

reiterated the message that the narthex was to be understood as a "middle ground" distinct from both the exterior world and the sequestered space of the monastic church proper. As such the transitional passage could be equated to a four-part exegetical understanding of the space: the "literal" of the exterior tangible world is transformed by the ascension into the "allegorical" space of the narthex, which in turn signals the "tropological" passage to be undertaken within the length of the nave, and which facilitates the "anagogical" transcendence anticipated at the eastern altar and beyond in the apse (Figure 13.27).[54] Importantly, the transition between each of these zones is marked by a portal or opening that begins with the elaborate archivolted configuration at the western end, becoming less and less tangible as one moves, either physically or meditatively, towards the rarefied spirituality of the eastern end of the church.

With the supposition that an open-archivolted configuration was indeed the model for the portal, my second consideration in reconstructing Maillezais's portal was the size of the columns supporting the archivolts. Beginning with the standard of one column and archivolt per step, it follows that the smaller the column, the more steps possible. Thus working with the 3.5 m separating the visible remnants of the original inner wall and the exterior at the base of the fortification wall, which reasonably represents the depth of the portal opening, three regionally common column sizes have been considered—the largest in diameter (1 m) corresponding to those columns extant in the abbey's nave, the medium size (0.75 m) conforming to the two interior columns now embedded in the corners of Maillezais's narthex,

54 For exegetical reading patterns, see Henri Lebac, *Medieval Exegesis: The Four Senses of Scripture*, (Edinburgh, 1959/2000).

and the smallest, reflecting the size of the columns on the local parish portals (0.5 m), such as that at Maillé (see Figure 13.22). These three column sizes have been adapted to the space to produce three possible portal configurations (see Figures 13.12, 13.13 and 13.14). It is tempting to assume the consistent employment of columns the size of those embedded in the interior wall, which would have produced an ornate configuration of five archivolts similar to that seen on two of Maillezais's parishes—Maillé and Maillezais built in the early 12th century on land donated for this purpose in 1073 (see Figures 13.22 and 13.23).[55]

Looking to the portals on the tower models, the more conservative solution, consistent with the date of the construction of Maillezais's narthex would have been that configured using the largest columns. This would have resembled quite clearly the portal at Saint-Porchaire, except for the fact that the exterior steps at the Poitiers building have long since disappeared beneath modern urban accretion. At Maillezais, the rise of a step in the stair turret is 20 cm, which is consistent with risers on the interior of the narthex at Sainte-Radegonde and Saint-Porchaire. Given this dimension, the two-column/two step solution does not provide an extensive rise in elevation within the space of the portal unit, reiterating the requirement established by the church's topographical siting for a significant number of external steps in front of the façade to accommodate the elevation of the narthex. Until the area in front of the western façade has been fully excavated, one can only draw inferences about the details of these exterior steps.

Other aspects of the portal's configuration can, however, be stated more definitively. For instance, the transverse arch of the interior barrel vault can be used to determine both the shape and the fullest extent of the height of the portal's arched opening, while the size and shape of the tower's proposed tribune level western windows can be determined by the height and width of the extant north and south windows at that same level. Similarly, the suggestion of a double window configuration for the tribune's west façade, matching the size and shape of those on the north and the south, is verified by the remnants of the original arc still visible on both the interior and exterior of this western wall to either side of the rectangular Gothic opening that replaced these round-arched windows.[56] Most likely left from the removal of decorative moldings, the curvature of this arc replicates that of the singular windows on the north

55 Rene Crozet, "Maillezais," in *Congrés Archéologique de France,* La Rochelle (Orleans, 1956), 80–96; and Élisa Maillard, "Les Facades Romanes de Saint-Nicolas de Maillezais et Notre-Dame de Maillé," *Bulletin de la Société des Antiquaries de l'Ouest et des Musèe de Poitiers* 4 (1927): 520–28.

56 Camus and Bloome, "L'abbatiale," 166.

FIGURE 13.28 Maillezais Island, manipulated photo to create watery coastline

and south walls.[57] Finally, the portal's height in relation to the height and number of the tribune windows, along with comparative measurements taken from other towers of the region, suggests a tripartite division of the tower elevation with a third story of proportionally smaller windows under a gabled roof.

Reconstructed in this comparative manner, the plan and façade elevation help in the visualization of the narthex/tower in its geographical context. With these insights, it can be stated more definitively that Maillezais's narthex/tower with its archivolted portal configuration was comparable to, although perhaps somewhat larger than, contemporary towers found on other abbeys of the Poitou region. However, the distinctive topographical siting of this new architectural addition on the highest point in the gulf, facing out to the open sea, was indeed unique (Figure 13.28). And thus, incorporating the visualization of this geographical setting into the contextual analysis is key to our understanding of the abbey's role in the regional power dynamics. This brings us back to the correlation between the abbey's two simultaneous construction projects—the architectural relocation and renovation of the abbey church with the development of the extensive aquatic management system.

57 Camus, "Imaginer," 266–67, suggests that based on the high quality of the extant capitals that crown the columns in the nave and the two remaining in the narthex, as well as the few fragments preserved in the monastery's stone depository, we can assume that string coursing, supporting corbels, window ornamentation, and archivolt sculpture would have been similarly impressive.

In conjunction with the general parameters of reform, the new abbey's well-attended consecration in 1010[58] initiated a long series of land donations on which a network of parish churches were built around the abbey on what must have been newly drained outcroppings.[59] Historical documents tell us that while the original abbey had been built on the site of Emma's vision—the abandoned chapel near the inland port of the island—with the donation of the palace for the building of the new abbey, the old abbey chapel at the inland port became the first parish—Saint-Pierre-le-Vieux.[60] Shortly thereafter the parish of Maillé was constructed on donated land at the gulf port of the island. By the 12th century, seven other parishes—Souille, Liez, Courdault, Damvix, Vix, Doix, and the parish of Maillezais—had been added to this network, visually marking the abbey's influence over the eastern end of the gulf (Figure 13.29). Importantly, in terms of our visualization of Maillezais's missing façade and portal configuration, each of the parishes would have had a similarly configured western portal. Like those extant at Maillé and Maillezais parish, it seems highly likely that Mailezais's portal would have been ornamented with radially arranged voussoirs, sculpted around inwardly stepped, concentric archivolts, the centermost of which was left open and specifically tympanum-free.[61] As such, the parishes replicated on a smaller scale what, I argue by way of the reconstruction drawings, was also the visual presentation of the mother institution. These parishes thus served to physically mark the extent of the abbey's landed domain, while visually stating their institutional alliance.[62]

In terms of creating a "sense of place" however, cultural geographers highlight the way that this sort of systematic repetition can be seen as a type of visual branding of the landscape, where what we see on the surface should signal a deeper cultural meaning.[63] Consideration of the ethnography of a place—the particulars of a lived, daily experience—compels us to incorporate

58 Pon and Chauvin, *La fondation*, 108–09; Bord, *Maillezais*, 36–37.

59 Louis Delhomme, *Notes et documents pour server à l'histoire de l'abbaye Saint-Pierre de Maillezais au diocese de Luçon depuis sa fondation (976) jusqu' à son érection en évêché par le Pape Jean XXII (13 août 1317)* (Paris, 1961), VI–VII; Stephen White, "'Pactum…legum vincit et amor judicium': The Settlement of Disputes by Compromise in Eleventh-Century Western France," *American Journal of Legal History* 22 (1978): 281–308, especially 306; and Barbara Rosenwein, *To Be a Neighbor of Saint Peter* (Ithaca, 1989).

60 Bord, *Maillezais,* 13–15. The extant church is the product of a later remodel and contains no material of the original abbey.

61 Maillard, "Les Facades," 529–28. Abel, *Open Access*, 121–57.

62 Abel, "Within," 385–416; Kurt Bohner, "Urban and Rural Settlement in Frankish Kingdoms," in *European Towns, Their Archaeology, and Early History*, ed. M. Barley (London, 1977), 185–202.

63 Stephen Feld and Keith Basso, "Introduction," in *Senses of Place*, ed. Stephen Feld and Keith Basso (Santa Fe, 1996), 3–12; and Denis Cosgrove, *Social Formations and Symbolic Landscape* (Madison, 1984), 17–18.

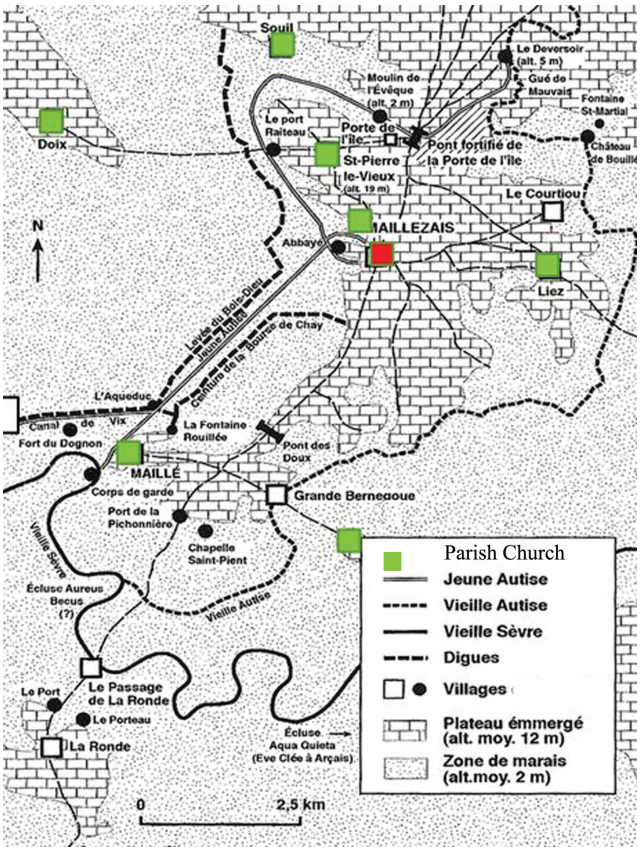

FIGURE 13.29 Maillezais Island with distribution of parish churches

the empirical perceptions of all components of a hypothetical audience.[64] In this sense the interpretation of the visual message to be understood through the architectural repetition would have differed in significance for the monk, parish priest, parishioner, or local noble. This more multivalent approach suggests that we consider these buildings as more than just similarly configured, static landmarks; we have to see them as "embodied" places with both internal and external horizons created through the personalized perception of experiential sensory phenomena. They were enlivened with sound, ornamented with

64 Edward Casey, "How to Get from Space to Place in a Fairly Short Stretch of Time: Phenomenological Prolegomena," in *Senses of Place*, ed. Stephen Feld and Keith Basso (Santa Fe, 1960), 13–25.

imagery, and made mystical through liturgical praxis where they were meant to be moved through and animated by actions.[65]

Indeed hagiographic sources alert us to the existence of multisite liturgical processions, which were a localized feature of this era of post-Peace of God, monastic reform.[66] When linked together in this type of domain-identifying procession, the parishes built around Maillezais would have formed a metaphorical zone of spiritual protection—in essence expanding the walls of the monastic enclosure.[67] The podium-like porches created by the combination of the concentric archivolts and the portal steps would have been employed as nodal points marking each segment along the procession. Acting as a stage and backdrop for the enactment of ritual, they served to record and memorialize the liturgical actions performed therein.[68] While the repetition of this prominent architectural feature would have united the individual segments of the procession, the visual linkage would have been particularly significant when seen in relation to the portal of the mother abbey where a procession such as this would have begun and ended.[69] Overlying this kinetic perception is

65 For the study of the correlation between liturgical perception and architectural space, I refer the reader to Allen Doig, *Liturgy and Architecture: From the Early Church to the Middle Ages* (Farnham, 2008); Helen Gittos and Sarah Hamilton, eds., *Understanding Medieval Liturgy: Essays in Interpretation* (Farnham, 2016); Giselle de Nie and Thomas Noble, eds., *Envisioning Experience in Late Antiquity and the Middle Ages* (Farnham, 2012); and Barbara Hanawalt and Micheal Kobialka, eds., *Medieval Practices of Space* (Minneapolis, 2000); particularly in this last volume, Michael Kobialka, "Staging Place/Space in Eleventh-Century Monastic Practices," 128–48.

66 Kristina Kruger, "Architecture and Liturgical Practice: The Cluniac Gailiaea," in *White Mantle of Churches: Architecture, Liturgy, and Art around the Millennium*, ed. Nigel Hiscock, International Medieval Research 10 (Turnhout, 2003), 138–59; Geoffrey Koziol, *Begging Pardon: Ritual and Political Order in Early Medieval France* (Ithaca, 1992), 253; and Remensnyder, *Remembering*, 32. The bibliography on the Peace of God and monastic reform is vast; the issues relating to them continue to be debated long after the publication of Thomas Head and Richard Landes, *The Peace of God: Social Violence and Religious Response in France around the Year 1000* (London, 1992); and Stephen White, *Feuding and Peace-Making in Eleventh-Century France* (Aldershot, 2005). The relationship of these issues to the visual dimension of a monastic "domain" is explored in greater depth in Abel, "Before Nationalities," 5–11.

67 The property and privileges held by a monastic house were imbued with both spiritual and temporal dimensions. I refer the reader to Megan Cassidy-Welch, *Monastic Spaces and Their Meaning: Thirteenth-Century English Monasteries* (Turnhout, 2001); and James Bond, *Monastic Landscapes* (Stroud, 2004), for the intricate relationship between these two concepts, which tend to be more distinct in the eyes of modern scholars than they were in practice in the Middle Ages.

68 Abel, "Within," 385–416.

69 Terrence Bailey, *The Processions of Sarum and the Western Church* (Toronto, 19710), 93–103. The bibliography on ritual space, performance, and procession is growing. I refer the reader to Barbara Rosenwein, *Negotiating Space: Power, Restraint, and Privileges of Immunity in Early Medieval Europe* (Ithaca, 1999); Nils Petersen, Mette Bruun, Jeremy Llewellyn,

FIGURE 13.30 Maillezais region, Modern festival

the contextual understanding that Maillezais's processions were only possible with the construction of the hydraulic infrastructure. This topographic reality allows us to imagine an aquatic possession where the participants and clergy moved between sites on the flat-bottomed boats still in use on the modern canal system, while others lined the canal banks to witness the spectacle (Figure 13.30). Participation in these communal rituals allowed the inhabitants of the region to internalize, both physically and visually, the power dynamics linking the duke and the abbot. The tangible benefits to their everyday life, such as the availability of bread, salt, and fish made possible by the infrastructure, were given spiritual significance in the ritual blessing of the sites along the aquatic processional route and the reiteration of "community" in the visual linking of the parishes to the abbey. The ducal family's role in this mutually beneficial program was no doubt made clear with the commemoration of donations in the liturgical calendar.

With the insight provided by the plan and the elevation in conjunction with the visual context of the abbey's new higher location, sited to face west, out toward the open gulf, it is easy to imagine that the designers of this monumental structure wanted a building that would visually advertise the abbey's new

and Eyolf Ostrem, eds., *The Appearances of Medieval Rituals: The Play of Construction and Modification* (Turnhout, 2004); Wendy Davies, Guy Halsall, and Andrew Reynolds, eds., *People and Space in the Middle Ages 300–1300* (Turnhout, 2006); and Brian Spinks, *Early and Medieval Rituals and Theologies of Baptism* (Aldershot, 2006).

political, economic, and geographical dominance. Marking the entry point into a Christian domain, politically tamed through the lucrative management of a hydraulic system, Maillezais's prominently located narthex/tower with its highly visible portal situated at the edge of the sea, represented a visual broadcasting of a multivalent identity. It was a message that was communally understood, signaling both the political dynamics of the geographical passage and the reciprocal benefits of the spiritual entry.

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CHAPTER 14

Adaptation and Audience: Remodeling Notre-Dame d'Étampes in the Thirteenth Century

Sarah Thompson

In the first half of the 13th century, the canons of Notre-Dame d'Étampes significantly altered the exterior of their church. Once the renovations were complete, Notre-Dame possessed three new western portals, creating a unique composition that opened onto the rue de la Poule (now the rue de la République) in the direction of the rue Saint-Jacques (now the rue Louis Moreau) (Figure 14.1). Prior to that date, the church's south portal—an impressive undertaking that itself was an addition to the structure at the end of the 1130s or early 1140s—served as its public face. This was a prestigious entrance: a 'Royal Portal,' with diagonally splayed jambs lined with sculpted kings, queens, and prophets, facing a royal residence seated directly across the street. With the south portal in existence, why would the college of canons agree that the substantial expense of a potentially redundant building campaign would be a good investment?

Few historians of medieval art have paid any regard to Notre-Dame's western additions. The renown of Notre-Dame d'Étampes depends upon the south portal (Figure 14.2), remarked for the connection between the "Étampes Master" and the northwest portal of Chartres Cathedral; this relationship between the two sites means that Étampes features heavily in the literature on the development of Early Gothic portal sculpture, discussed in the works of Vöge, Stoddard, Armi, and Sauerländer, among others. The context of the south portal consistently frames scholarly investigations of Notre-Dame's architecture. While the church's frustratingly complex building chronology has perhaps kept it from becoming a more frequently cited example of Early Gothic, for those who do study the site, the 12th century has always taken precedence. The first half of that century witnessed confluent circumstances—the town's rising importance as part of the royal domain, the extended presence of royalty in Étampes, several significant councils, the establishment of members of the royal family and their courtiers as *abbés* or canons of the church—that suggest compelling motives for Notre-Dame's building and sculptural campaigns, and these narratives have typically overshadowed the later changes to the building.

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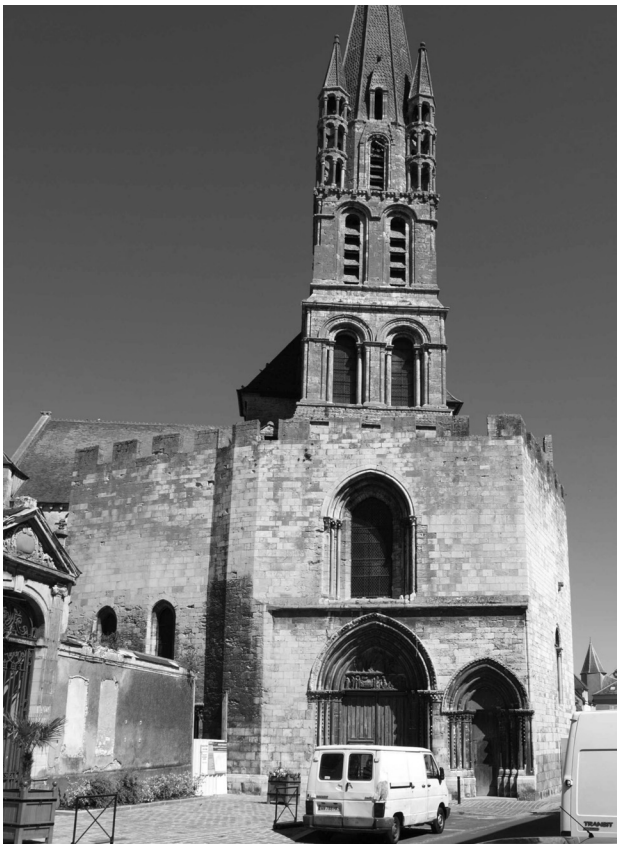

FIGURE 14.1 Étampes, Church of Notre-Dame: west façade

Scholars studying medieval buildings often focus on particular moments—of inception, of apogee, or of supposed completion, for example—rather than studying a building as an ongoing process, with each transformation driving the narrative of the building's formal or historical significance.[1] Scholarship on Notre-Dame exemplifies this phenomenon. Though the church was altered in subsequent centuries, which saw the additions of the new western façade, a remodeled sacristy, replacement of the nave clerestory, additions of

1 This focus has shifted in the last two decades, as scholars including Marvin Trachtenberg, Janet Marquardt, Stephen Murray, and Nicola Camerlenghi employ diachronic methodology in the study of medieval sites. *The Long Lives of Medieval Art and Architecture* (Jennifer Feltman and Sarah Thompson, eds.) addresses possibilities of diachronic approaches across media and geography.

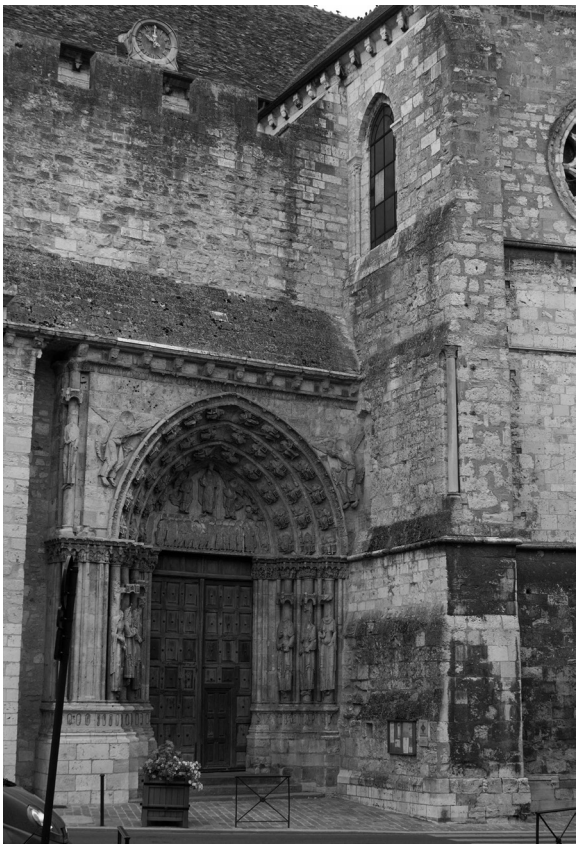

FIGURE 14.2 Étampes, Church of Notre-Dame: south portal

stained glass and sculpture, the installation of an organ, and a major restoration program, these changes are typically treated as footnotes in the story of a gestalt of early Gothic. Analyzing the motivations and effects of this remodeling demonstrates the value of studying a building beyond its most famous or characteristic era, recognizing that medieval buildings transform over time, illuminating the concerns of successive generations of patrons and users. Diachronic methods consider a building as a kind of unfolding process, rather than as the product of a single moment or single idea. An expansion of the usual temporal bookends at Notre-Dame d'Étampes reveals that the church was neither frozen after the 12th century, nor was it subject to only minor changes. Rather, the canons remade the exterior of their church in response to circumstances that necessitated an appeal to a new audience, marking the continuing symbiotic relationship between the church and its shifting urban context.

1 The Context and Fabric of the 13th-Century Campaign

Notre-Dame d'Étampes is known for its complicated construction history. Its foundation by Robert the Pious in the 11th century seems to provide a point of certainty within the building's extended chronology, although an investigation by Gineste has cast doubt on the legitimacy of this tradition and suggests that Robert and his successors provided funds to an existing foundation.[2] As the building currently stands, its earliest campaign is the small-stone, groin-vaulted crypt. With the likely exception of the lower part of the tower stair,[3] everything above ground dates from the early 12th century forward, although no specific documentation for the funding of construction or consecration of altars enables the firm establishment of specific years. The building's multiple campaigns can be dated in relation to each other, however. For example, the encasing of nave-type drum piers with additional dosserets and colonettes, their profiles associated with the transept campaigns, indicates that the nave came first (Figure 14.3). Determining precise years is a process of making stylistic and structural comparisons with other sites, such as Saint-Pierre de Montmartre for the nave or Chartres's west portals for the south portal sculpture. Such study suggests a sequence of construction as follows: nave, *c.*1130; choir, *c.*1135; north building (later remade as a sacristy), *c.*1135; south portal, *c.*1140; north transept and choir aisles, *c.*1140–50; and south transept and choir aisles, *c.*1150–60. Each campaign underwent revision and consolidation even before completion; for example, the north transept's height was increased. While each of these broad campaigns represents a construction break and a shift in both style and structure, some continuity can also be found from one campaign to the next, and it seems probable that campaigns in different parts of the building may have been in progress simultaneously. Masonry breaks and stylistic discontinuity of forms lead to the conclusion that work at Notre-Dame d'Étampes had halted for some decades by the time the west façade campaign was begun, suggesting that this western block is not an extension of the 12th-century pattern of ongoing, overlapping campaigns.

The church's piecemeal construction does not mean it lacked prestigious ties. Even if Robert the Pious did not found the building, it was a collegiate church with strong connections to the Capetians during an era when the

2 Bernard Gineste, "Henri Ier: en faveur de Notre-Dame d'Étampes," *Corpus Étampois.* Last modified 14 July 2011. http://www.corpusetampois.com/cls-11-henri1notredame1046.html.

3 Elise Baillieul, "Les vestiges romans de la collégiale Notre-Dame d'Étampes, témoins du mécénat architectural de Robert le Pieux," *Livraisons de l'histoire de l'architecture* 25 (2013): 17–24.

FIGURE 14.3 Étampes, Church of Notre-Dame: interior looking southeast

town of Étampes became an increasingly significant part of the royal domain. Strategically located and surrounded by fertile grain fields, Étampes played host to national councils and often sheltered the royal family; Louis VII visited at least 23 times during his reign (1137–1180).[4] French royals built several residences here, including the so-called Palais de Sejour and the Tour Guinette with surviving remains, and the site across from Notre-Dame itself, known through documentation as the probable site of Robert's queen, Constance's, "palace with an oratory."[5] Notre-Dame was given numerous privileges under Robert the Pious, Henri I, Philip I, Louis VI, and Louis VII, ranging from

4 A. Luchaire, *Études sur les actes de Louis VII* (Paris, 1885), 62–68.

5 Helgaud of Fleury, *Vie de Robert le Pieux*, ed. R.H. Bautier (Paris, 1965), 64; Monique Chatenet, "Le donjon," *Étampes: un canton entre Beauce et Hurepoix*, ed. J. Fritsch and D. Hervier (Paris, 1999), 39–41.

grants of land to fairs to having its canons named perpetual chaplains to the royal household in Étampes.[6] A position as a canon of Notre-Dame seems to have been a financial perquisite offered to those close to Louis VI, as royal chancellors Étienne de Garlande and Algrin d'Étampes both counted this position among their many other religious appointments. Although the church fell under the jurisdiction of the archbishop of Sens, the king had the right to appoint the *abbé*, and two of Louis VII's brothers held the title in the mid-12th century: Henry, who came to office *c*.1137 and who was also the *abbé* of Saint-Spire in Corbeil, and Philippe, who received the title from his brother around 1147 when Henry became Bishop of Beauvais.[7] The projection, orientation, and imagery of the church's south portal would seem to speak to this level of royal prestige. Set within a projecting surround, facing a palace where the canons acted as chaplains, and flanked by images of righteous kingship from the Old Testament, the portal announced Notre-Dame's connections and function to passing audiences.

In adding the western portals, the canons sponsored a campaign that would completely revise the profile of, and public approach to, their building. Exactly what they were replacing is unclear: the upper stages of Notre-Dame's impressive western tower were built in several phases in the 12th century. Elise Baillieul's analysis of the lower levels of the tower stairway suggests that there was likely a squared 11th-century tower that served as the base of the current tower, but no evidence survives of the appearance of a prior western façade or portals.[8] The angled position of the current façade in comparison to the tower would seem to indicate that the new work did not follow the ground plan of a previous façade dating from the tower's era. Obviously, the church had a western enclosure, but its form, including the presence of any openings, remains debatable.

The new campaign visually enlarged, strengthened, and ornamented the church. Notre-Dame was partially wrapped in new masonry: exterior walls were extended into a *chemin de ronde* (an elevated walkway with battlements) that enclosed the west end, framed the tower, and continued around the south nave aisle and north and south choir aisles. Battlements are more typically associated with military architecture, but fortified churches were also built, and battlements were used prominently at a number of French sites, including

6 J. Dufour, *Recueil des actes de Louis VI, Roi de France* (Paris, 1993), 473.

7 Dom Basile Fleureau, *Les antiquitez de la ville et du duché d'Estampes*, facsimile edition (Marseille, 1977), 296, 350.

8 Baillieul, "Les vestiges romans," 20.

the west façade of Saint-Denis. At Étampes, this feature might project strength, or perhaps allude to connections with other prestigious or royal sites.

The chemin de ronde begins with a masonry break visible on the north edge (Figure 14.4), where it joins the north choir aisle. As it continues around the west, it incorporates two windows with two orders of simply chamfered moldings above a portal (now nonfunctional) with three orders of chamfered archivolts, capitals with sharply defined leaves and buds, and two *en délit* shafts to either side. A wall buttress marks an angle between the northern third and southern two-thirds of the façade; this unusual layout likely results from expansion within a constrained site. While the extent of the canons' houses and the hospital complex in the 12th century are not known, they were present to the north of the church in some form and had to be accommodated when planning the new construction. Moving south, the remaining section of the west façade—the part directly visible from the rue de la Poule (rue de la République)—has an upper window and two portals that are much more elaborately molded. The window, with four orders of molding, crocket capitals, and

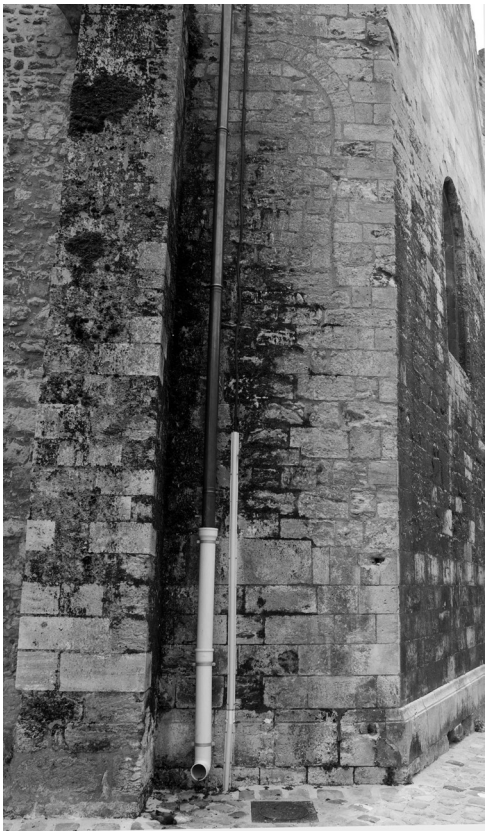

FIGURE 14.4
Étampes, Church of Notre-Dame: masonry break at northwest corner of chemin de ronde; misalignment begins seven courses from ground level

en délit shafts (some now missing), sits above a sloped molding with a rounded edge. Below are two more portals, both with a mixture of crocket and foliate capitals and *en délit* shafts, and both extensively decorated with ball-studded moldings (Figures 14.5 and 14.6).

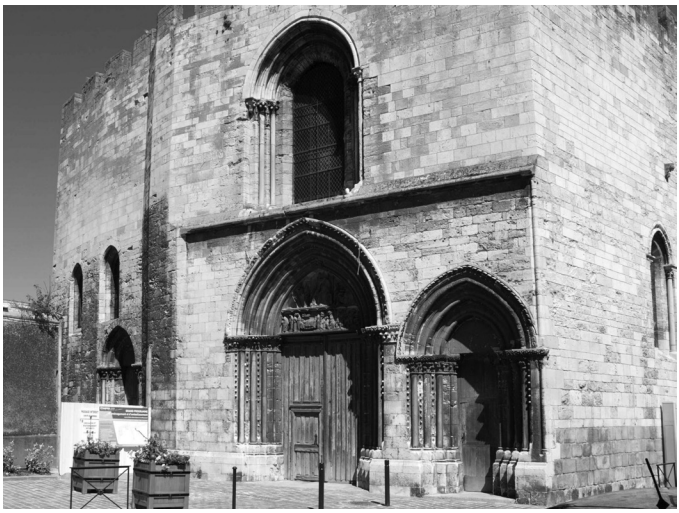

FIGURE 14.5 Étampes, Church of Notre-Dame: west façade showing all three portals and wall buttress between north and central portals

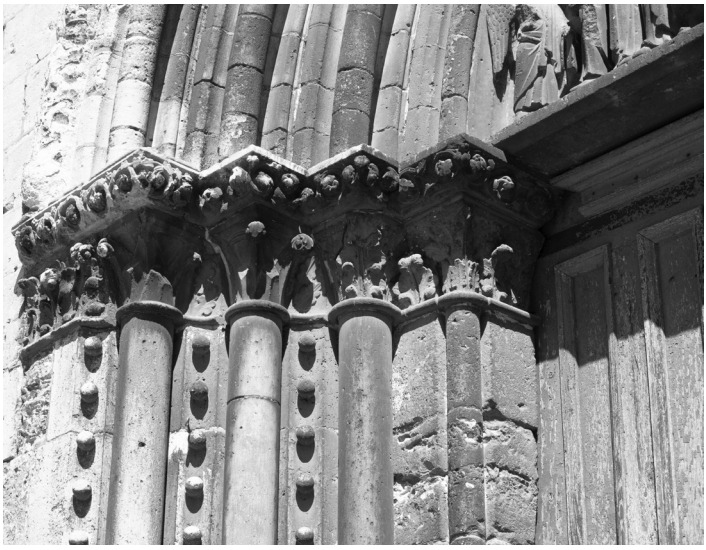

FIGURE 14.6 Étampes, Church of Notre-Dame: west façade, detail of left jamb of central portal

While the tympana of the flanking portals are bare, the historiated tympanum and lintel of the larger central portal clearly portray scenes from the life of the Virgin and the early life of Christ (Figure 14.7). The figures are badly mutilated, but the Virgin and Child are obviously enthroned in the tympanum, with the Dream of the Magi to the right conveyed by the three crowned men stacked in a bed and the iconography of an Adoration of the Magi scene still discernable in the standing and kneeling forms to the left; the star appears just to the left of the Virgin's surviving halo. A blunted form that appears to be winged—an angel?—leans out from the apex of the archivolts above. A molding of segmented arches separates the tympanum from the lintel, which from left to right shows the Annunciation, Visitation, Nativity, Annunciation to the Shepherds, Massacre of the Innocents, and Flight into Egypt.

The 12th-century nave aisles may once have extended one bay further west, flanking the tower, and in the course of the 13th-century façade addition those bays were remodeled as chapels. The portal associated with the north chapel has been blocked, and its limited span makes it questionable that it was ever much more than decorative, but the south chapel had a narrow but functioning portal, and the vaulted bay below the tower opened through the wide, new, central portal. An upper floor of the tower was also remodeled (today, this room provides access to the organ loft). Evidence for these changes is visible inside Notre-Dame. In the southwest nave aisle bay, the formeret is supported on part of an impost and a dosseret now embedded in a later wall (Figure 14.8). The dosseret-and-impost combination are identical to those found in the other nave aisle bays, indicating that the aisle once extended further west. In

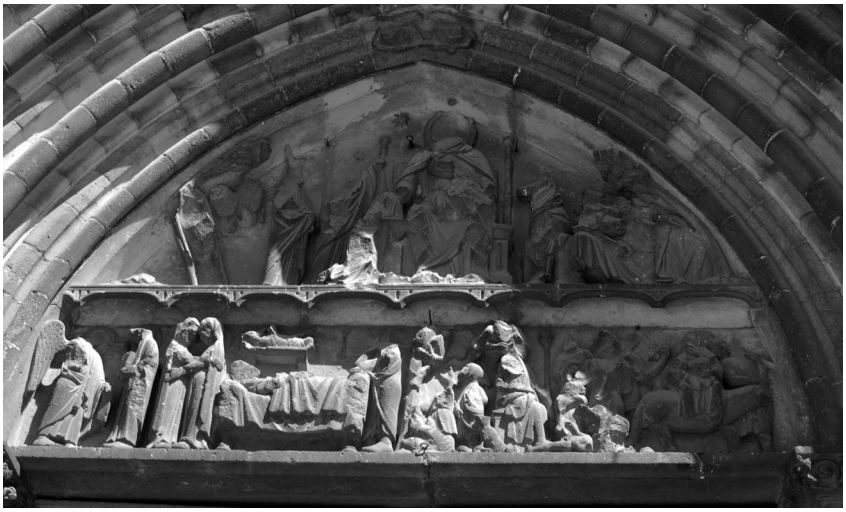

FIGURE 14.7 Étampes, Church of Notre-Dame: tympanum of central portal of west façade

FIGURE 14.8
Étampes, Church of Notre-Dame: interior of southwest nave chapel, south side, showing embedded dosseret and impost with 13th-century masonry additions, including crocket capitals and ball moldings

the north nave aisle, a similar construction was used, although here the capital and colonnette still remain and have been used to support a later transverse arch (Figure 14.9). The location and details of the chapel conversions and tower room remodeling—including the crocket capitals found in the south chapel and in the tower room—are consistent with the west façade campaign. Ball moldings also unify the entire addition. As noted by Lefèvre, these moldings appear at the northeast and southeast corners of the building, as part of the chemin de ronde that extends from the east side of the north transept arm around the north choir aisles and chapels (Figure 14.10), and in a small section on the exterior above the south choir aisle chapels (Figure 14.11). These same moldings appear in the new western chapels and on the jambs of two of the western portals.[9]

9 Louis-Eugène Lefèvre, "La façade occidental, portails, et fortification de l'église Notre-Dame d'Étampes," *Bulletin de la Société historique et archéologique de Corbeil, d'Étampes, et du Hurepoix* 13 (1907), 19–20.

FIGURE 14.9
Étampes, Church of Notre-Dame: 12th-century dosseret and colonette of northwest nave aisle chapel supporting 13th-century transverse arch

FIGURE 14.10 Étampes, Church of Notre-Dame: northeast corner showing exterior of north choir aisle and chapels; ball molding is at upper corner

FIGURE 14.11 Étampes, Church of Notre-Dame: southeast end showing wall extension above south choir aisles; ball molding at upper center

In the absence of any textual documentation for the campaign, comparative stylistic analysis can shed some light on its date. The presence of crocket capitals on the central portal and rudimentary crockets in the south nave aisle chapel and current organ loft narrows the possibilities slightly. Such capitals appear in construction from the second and third quarters of the 13th century and can be found broadly across France, including such Île-de-France sites as the interiors of the towers at Notre-Dame, Paris; the transept campaigns from the same; and the 13th-century work at Saint-Denis. The molding separating the tympanum and lintel differs somewhat from the more elaborate architectural moldings of Rayonnant, sculpted portals. While Jochen Staebel has suggested a connection with the transept portals of the Cathedral of Notre-Dame in Rouen,[10] the connection with the *c.*1240 portal of Saint John the Baptist (the north portal of the western façade) provides a closer match (Figure 14.12). The arches at Rouen are more decorative, with trefoils in the spandrels and moldings of their own, but both portals have a series of flattened arches extending over and framing scenes in the lower register. The figural style

10 Jochen Staebel, *Notre-Dame von Etampes: die Stiftskirche des 11–13 Jahrhunderts unter besonderer Berücksichtigung ihrer frühgotischen Bauskulptur* (Worms, 2003), 131.

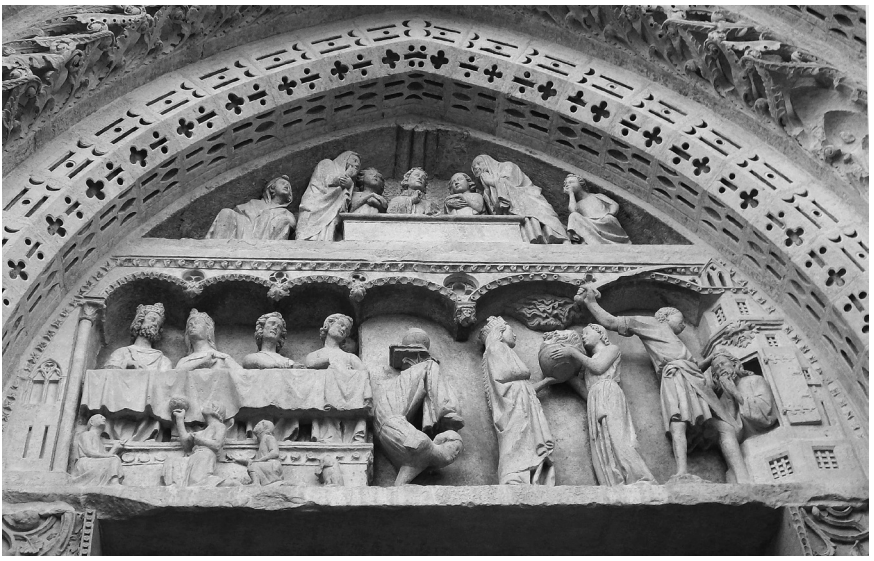

FIGURE 14.12 Rouen, Cathedral of Notre-Dame: tympanum of the portal of John the Baptist
PHOTO: GIOGO

of the Étampes portal is difficult to evaluate due to damage (heads and limbs were hacked away when the church was sacked in 1562, during the Wars of Religion).[11] The remaining forms indicate straight figures without the elegant sway that became typical in the latter half of the 13th century. Drapery folds form sharp vertical triangles, broadly similar to those at Rouen. Based on this evidence, a date between 1225 and 1250 seems probable.

Ultimately, this campaign resulted not just in expansion, but in a major reorientation of the building's emphasis. The 12th-century south portal, opening into the eastern bay of the south nave aisle, coincided with a contemporaneous enlargement of the church's east end to accommodate the activities of the canons (and any royal visitors) in the choir and choir aisles. In contrast, the 13th-century work indicated strong consideration for the church's western approach and an interest in space for lay visitors in the nave. Jutting outward toward the rue de la Poule, two of the portals—those receiving the heaviest concentration of sculpted decoration—would have caught the eyes of those walking from the direction of the rue Saint-Jacques. The new tympanum would announce the church's dedication to the Virgin, and new chapels could welcome worshippers in the west end. A western façade with triple portals

11 Abbé Bonvoisin, *Notice historique sur le culte et les reliques des saints martyrs Cant, Cantien, at Cantianille, patrons de la ville d'Étampes* (Versailles, 1866), 44–45.

referenced the prestige of cathedral foundations. The practical function of the chemin de ronde and battlements was negated by the large windows and portals of the church, but they created an elevated, powerful profile and differentiated Notre-Dame from other sites of worship at a time when Étampes had five significant religious foundations competing within close quarters—Notre-Dame, Sainte-Croix, Saint-Basile, Saint-Gilles, and Saint-Martin—with Notre-Dame's former dependency, Saint-Basile, and its new rival for royal attention, Sainte-Croix, only a few steps away.

2 Changing Patronage, Changing Programs

As with the earlier campaigns at the church, no surviving documents describe the construction or financing of the western portal campaigns, making it difficult to prove the motivations for the new work with absolute certainty. Previous authors have suggested that the chemin de ronde coincides with the suppression of the Étampes commune around 1200,[12] though Anthyme Saint-Paul pointed out that the defenses were not practical.[13] Baillieul focuses on the visual symbolism of the crenellations in an era when Notre-Dame faced challenges to authority,[14] an appropriate explanation, although a desire to practically or symbolically strengthen the building with battlements does not account for the emphasis on the western portals built as part of the same campaign. However, changing circumstances at Notre-Dame did coincide with the new addition. Waning royal attention to Étampes and new competition for visitors may have inspired an attempt by the canons of Notre-Dame to redefine the church for a new audience.

After 1180, Étampes did not welcome the royal family as often as it had in the past: Philip Augustus spent significantly less time in Étampes than had his father or grandfather, signing a single act here.[15] Given that he exiled his wife, Ingeborg, to Étampes for a decade of the 20-year span when he repeatedly attempted to dissolve the marriage, he likely had little interest in living here himself. His successors failed to reverse this trend: Louis IX favored such sites as Saint-Germain-en-Laye, Vincennes, and Asnières when out of Paris, and was recorded as visiting Étampes only eight times (April 1246; July 1247; May 1248; October 1254; April and October 1255; December 1256; July 1260) in his 44-year

12 Lefèvre, "La façade," 21.

13 A. Saint-Paul, "Notre-Dame d'Étampes," *Gazette archéologique* 9 (1884), 216.

14 Elise Baillieul, "L'ancienne collégiale Notre-Dame d'Étampes, un monument du premier art gothique," PhD diss., Université Charles de Gaulle-Lille 3 (2012), 77.

15 H. Delaborde, *Recueil des actes de Philippe Auguste, Roi de France*, vol. 1 (Paris, 1916), 414.

reign—a third of the visits his great-grandfather Louis VII made over a similar span of time. His visits must have been short, as in each case he is recorded in several other sites during the same month.[16] Louis shifted the governance of Étampes and the outlying areas from his immediate control by creating the Barony of Étampes in 1240. While the title, raised to a county, stayed within the extended royal family until the 15th century, the holders of these titles did not regularly occupy the Capetian palaces in Étampes.[17]

In the absence of the king and court, the canons of Notre-Dame went without the payments they had formerly received for saying Mass in the presence of the royal family. While Philip Augustus assumed the role of *abbé* of Notre-Dame in the 1190s, and from this point the crown nominally held the title, the king's motivations were likely financial. The royal *abbés* were rarely if ever present, as from this date onward the precentor assumed the duties of the *abbé*.[18] Notre-Dame also found itself with a rival for royal favor in Étampes: Philip Augustus had converted a former synagogue into the collegiate church of Sainte-Croix in 1183.[19] Apparently threatened by Sainte-Croix, the canons of Notre-Dame unsuccessfully attempted to claim control over the new foundation with a forged papal bull.[20] As Étampes declined in favor as a royal residence, the Capetians withdrew their direct support of Notre-Dame, and the royal subvention moved from the general financial support of the college to the funding of specific services and chantries within the church. Chantry priests benefited financially, the canons less so. Louis IX was likely on the throne when the 13th-century work at Notre-Dame was undertaken, but his interest in Notre-Dame seems to have been perfunctory when compared to his involvement at other religious sites. His major donation came in 1255, the year he made two of his eight total visits to Étampes and founded two chantries dedicated to saints Peter and Denis to commemorate the death of his mother Blanche, whose holdings had included the town.[21] Geoffrey de Beaulieu recorded that Louis "procured innumerable Masses from many religious communities" for his mother's soul; the endowment of chantries at Étampes does not seem remarkable in these circumstances.[22]

16 Joseph-Daniel Guigniaut and Natalis De Wailly, eds., *Recueil des historiens des Gaules et de la France*, vol. 21 (Paris, 1855), 413–18, 499.

17 Léon Marquis, *Les rues d'Étampes et ses monuments* (Étampes, 1881), 53, 305.

18 Fleureau, *Les antiquitez*, 349–54.

19 Fleureau, *Les antiquitez*, 379.

20 J. Alliot, *Cartulaire de Notre-Dame d'Étampes* (Paris, 1888), x–xv.

21 Alliot, 10–11, 24–25.

22 Geoffrey de Beaulieu in *Vita et sancta conuersatio piae memoriae Ludovici quondam Regis Francorum*, translated by Larry F. Field, in M. Cecilia Gaposchkin and Sean L. Field, eds.,

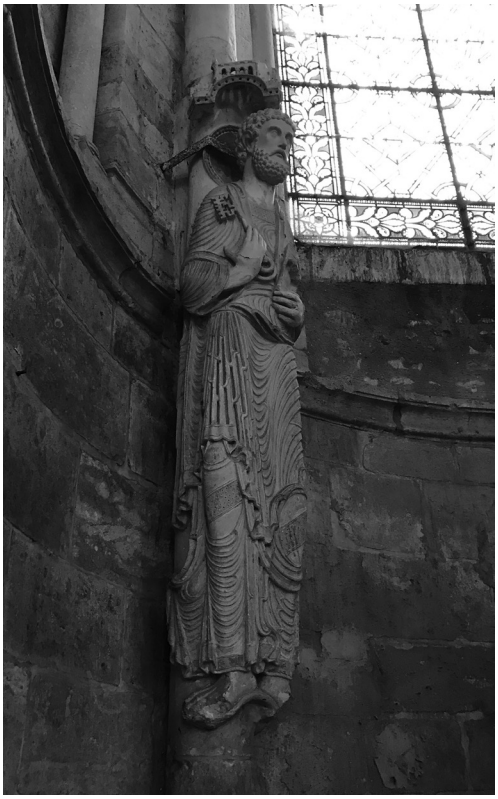

FIGURE 14.13
Étampes, Church of Notre-Dame: column-statue of Saint Peter from the northeast choir aisle chapel

Staebel has suggested that Louis IX's chantry foundations correlate with the 13th-century renovations,[23] but while the dates may roughly correspond, the physical evidence and the records of Louis's patronage elsewhere do not. Statues installed in the northwest choir aisle chapel resemble those of the south portal and would have been archaic in comparison to sculpture associated with Louis's sponsorship of sites such as the Sainte-Chapelle or Saint-Denis (Figures 14.13 and 14.14). Staebel speculates that they may be spolia from some lost western portal, moved to the chapel to rededicate it to Saint Peter when Louis endowed his chantry, but as yet conclusive evidence of the origin of these statues remains elusive. The heads and hands are plaster restorations, but the drapery of the statues bears a strong similarity to that of the south portal jamb figures, and the circumference of the attached shafts

The Sanctity of Louis IX: Early Lives of Saint Louis by Geoffrey of Beaulieu and William of Chartres, trans. Larry F. Field (Ithaca, 2013), 106.

23 Staebel, *Notre-Dame von Etampes*, 131–32.

FIGURE 14.14
Étampes, Church of Notre-Dame: column-statue of Christ from the northeast choir aisle chapel

aligns with those of the south portal.[24] The sharpness of the carving suggests that these works were not outside for any length of time. The rib vault profiles in these chapels, unique in the church, indicate a later revaulting in line with the consolidation of the chapel roofs when the chemin de ronde was built, but the capitals below the vault and above the statues are consistent with those in the rest of the north choir aisle campaign, indicating a date in the mid-12th century. Textual documentation does not indicate that any construction, or funding directed toward construction, accompanied the chantry foundations, and later nobles who founded chantries at Notre-Dame did so without associated architectural change (Louis d'Évreux founded the *chapellenies* of Saint-Paul and Saint-Denis in 1313).[25] The church of Notre-Dame eventually

24 I thank Chris Henige for these measurements, collected onsite in October 2021.
25 Alliot, 37–38.

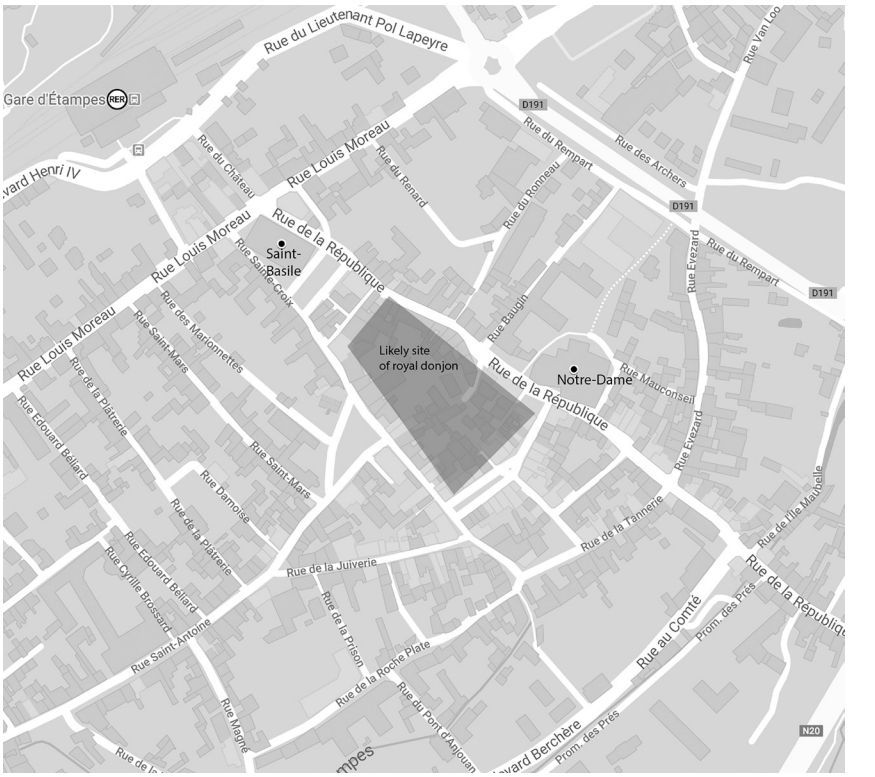

FIGURE 14.15 Plan of the neighborhood and street layout near Notre-Dame d'Étampes
MAP DATA: © 2019 GOOGLE

housed 17 such chantries.[26] The term indicates a supplementary altar manned by a priest whose services are endowed by a donor, not necessarily a defined space, and Notre-Dame has far fewer than 17 spaces that could be considered chapels. The only certainty about Louis IX's involvement with Notre-Dame d'Étampes is that he sponsored two chaplains who performed masses in his mother's memory.

Louis's limited presence and the minor privileges he offered the church in comparison to past Capetian royals characterize the changed status Notre-Dame experienced from the start of the 13th century. Faced with reduced royal contact and local competition, the college looked to alternative sources of income and prestige. A need to find new means of steady support as well as the proximity of the pilgrimage road to Santiago (the aforementioned

26 Fleureau, 340.

rue Saint-Jacques, leading from Paris to Orléans and eventually on to Spain) provided a strong incentive for the chapter of Notre-Dame to remodel their façade to attract a new audience. While documentary evidence for pilgrimage traffic within Étampes is relatively sparse, enough is known to indicate that pilgrimage traffic could be a desirable source of income. The hospital of Saint-Jacques de l'Epée appeared just outside the city's northeastern gate by 1164.[27] This foundation belonged to an order created in Spain during the Reconquista that fought under the banner of Santiago de Compostela and was devoted to the protection of pilgrims. The order was rare in France, and the construction of the hospital demonstrates sufficient pilgrimage traffic through Étampes to make such a foundation worthwhile.

After the canons officially lost control of their nearby parish church, Saint-Basile, when it was elevated to the head of its own parish in 1226,[28] their former dependent—located directly on the rue Saint-Jacques—became an additional rival (Figure 14.18). The loss of Saint-Basile provided further motivation for the chapter of Notre-Dame to publicize their own church's relics and associated miracles as well as to encourage lay visitors by building a western façade that would be visible from the rue Saint-Jacques. Intriguingly, the imagery chosen for the western portal advertises the new concerns of the church just as the royal figures on the south portal had connected Notre-Dame to their royal audience. On the west, the emphasis is not just holistically on the Virgin. The Adoration scene highlighted on the tympanum emphasizes the Magi's journey—depicting the outset with the dream to the right and the end with their camels to the left, so that the viewers' eyes travel across the scene—as well as the bringing of gifts, relevant themes when directed toward a pilgrimage audience expected to undertake journeys and leave offerings. Perhaps the choice of the royal Magi kneeling before the enthroned Virgin also subtly prodded Notre-Dame's former royal patrons, needling them to return to their supportive roles and recognize the superiority of the church.[29]

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27 Claudine Billot, "Étampes, formation et développement de la ville et de ses faubourgs," *Étampes, un canton entre Beauce et Hurepoix*, ed. Julia Fritsch and Dominique Hervier (Paris, 1999), 37.

28 Fleureau, 401.

29 Cecilia Gaposchkin previously noted a similar circumstance at Notre-Dame in Paris, suggesting that imagery on the Porte Rouge—also dating from the reign of Louis IX—was chosen to remind royals of their subservient position to the church in a time when Louis embraced a concept of royal sacrality independent of the traditional hierarchy of the church, and his attention increasingly turned toward the support of mendicant orders. Gaposchkin, "The King of France and the Queen of Heaven: The Iconography of the Porte Rouge of Notre-Dame of Paris," *Gesta* 39 (1) 2001, 58–72.

3 The Emergence of a Cult

Pilgrims to Notre-Dame could visit the relics of saints Can, Cantien, and Cantienne (Latin Cantius, Cantianius, and Cantianilla). Obscure today, these martyrs were supposedly the grandchildren of the Roman emperor Carus, executed near Aquileia in 304 for refusing apostasy.[30] Their bodies were initially interred at San Canzian d'Isonzo near Grado, formerly Aquae Gradatae. Maximus of Turin's panegyric spread the fame of the three martyrs,[31] whose busts grace a 5th-century silver casket found below the altar of the basilica of Sant'Eufemia in Grado.[32]

Tradition indicates that Robert the Pious brought the relics to Notre-Dame as a gift after a voyage to Italy. That the church of Robert's era included a spacious crypt would support that the church possessed some relics of importance in the early 11th century,[33] but we lack contemporary documentation confirming which relics these would have been.[34] A search for evidence supporting the traditional association of the relics of Can, Cantien, and Cantienne with Robert raises questions as to how and when Notre-Dame came to be in possession of these particular saints, as Robert's supposed magnanimous gift left no trace in any contemporary documents. While Robert did visit Italy, sources do not note him receiving relics there, and he was in Rome rather than Milan or Aquileia, two sites also claiming the relics of the three saints.[35] Helgaud of Fleury makes no mention of the visits or of a gift of relics when he credits Robert with the

30 Fleureau, 355–77.

31 Benedictine Monks of Saint Augustine's Abbey, Ramsgate, *Book of the Saints* (London, 1921), 57.

32 Ruth Leader-Newby, *Silver and Society in Late Antiquity: Functions and Meanings of Silver Plate in the Fourth to Seventh Centuries* (Aldershot, 2004), 105–07.

33 Christian Sapin et al., "Étampes. La crypte de la collégiale Notre-Dame," *Cryptes médievales et culte des saints en Île-de-France et en Picardie*, ed. Pierre Gillon and Christian Sapin (Villeneuve d'Ascq, 2019), 221.

34 No known medieval inventory of the treasury of Notre-Dame survives. In addition to the fragments of Can, Cantien, and Cantienne, Bredet lists a piece of skin of Saint John Chrysostom, a sachet with a rock from the tomb of Christ, and a lead flask with earth inside their châsse as of 1672. Léon Guibourgé noted reliquaries in the sacristy associated with Saint John Chrysostom, Gregory of Nazianzus, Saint Juliana, and Saint Basil in addition to Can, Cantien, and Cantienne and several early modern saints. S. Bredet, *La Cantiade, ou l'Eloge des illustres martyrs saints Can, Cantien et Cantienne, frères et sœur, composé par M. Sébastien Bredet* (Paris, 1673), 21; Léon Guibourgé, *Etampes, ville royale* (Versailles, 1957), 54–55.

35 François Duchesne, *Historiae Francorum Scriptores*, vol. 4 (Paris, 1641), 170; Bénédictins de la congrégation de S. Maur, *Recueil des historiens des Gaules et de la France*, vol. 10 (Paris, 1760), 166.

foundation of Notre-Dame, although he does detail Robert's gifts of relics and precious objects at other sites.[36] Nor are the relics mentioned in the charters of Robert's son or grandson, even though Philip I's charter reaffirms Robert and Henry's gifts. The only textual mention of the presence of the relics at Étampes in the 11th century comes from the work of the *abbé* Bonvoisin (the *curé* of Notre-Dame d'Étampes), writing in the 19th century, and Bonvoisin makes his claim—that Archbishop Léothéric of Sens brought the jawbone of one of the saints to Sens from Étampes—based on an unnamed 11th-century manuscript from Sens that other authors cannot confirm.[37] The single cartulary surviving from Sens in the aftermath of the Revolution makes no mention of Léothéric's gift. All other authors noting the removal of a jawbone to Sens associate the story with the archbishop of Sens in the 13th century.[38] No text source, and no other description of a primary source save Bonvoisin, mentions Can, Cantien, and Cantienne's presence at Sens or at Notre-Dame before the mid-13th century. The idea within the scholarship on Étampes that Robert returned with these relics after his Italian journey and presented them to Notre-Dame seems to be based on coincidence: if Robert founded the church, then he also donated the relics. As the 17th-century authors recording this connection lived in Étampes and wrote with the approval of the canons of Notre-Dame,[39] Robert's gift may have been an assumption commonly held within the town and encouraged by the church.

Investigating the presence of Can, Cantien, and Cantienne in Étampes reveals curious lacunae for a cult supposedly established with an 11th-century gift. The three are associated with a miracle that purportedly occurred within the church when it temporarily served as a hospital, which would seemingly place the events prior to 1225, the year an act describes the hospital of Notre-Dame outside the church: a woman named Sulpicia had a vision of the three saints and the Virgin predicting the healing of several patients and the death of another.[40] However, the earliest surviving account of this miracle dates from 1610 and was in turn based on late 13th-century documents (now lost)

36 Helgaud of Fleury, 113, 119.

37 Bonvoisin, 37.

38 Bredet, 9; Fleureau, 359; C. Forteau, "La rhapsodie du maître Pierre Plisson, avocat du roi au baillaige d'Etampes au XVIIé siècle," *Annales de la Societé historique et archéologique du Gâtinais* 27 (1909), 197.

39 Louis-Eugène Lefèvre, "Le miracle de la visitation de Notre Dame et l'aumônerie de l'église Notre-Dame," *Bulletin de la Société Historique et Archéologique de Corbeil, d'Étampes, et du Hurepoix*, 19 (1913), 74.

40 Lefèvre, "Le miracle," 77.

from the church's archive, not on a contemporary account.[41] Further miracles associated with the saints—healings and revivals of stillborn children—are either undated and described with insufficient references to allow for a narrowed span of time in which they could have occurred, or are described as occurring in or after 1282, the earliest documented date associated with the relics.[42] In that year, the relics of Can, Cantien, and Cantienne were brought in procession to the chapel of Saint-Lazare at the urging of the townspeople, who hoped to end a drought. Their reliquary then became too heavy to lift and could only be moved when a new, more splendid one was promised; the translation occurred in the presence of the archbishop of Sens, who left written testimony in the new *châsse*.[43]

Manuscripts mentioning the saints provide no support for a pre-13th-century cult in Étampes. Throughout the Middle Ages, entries for Can, Cantien, and Cantienne appear no more frequently in martyrologies produced near Étampes than in those from distant locations, and their entries mention no association with Étampes.[44] The martyrs' earliest mention in breviaries for the use of Sens or Paris comes in the mid-13th century. The earliest may be Bibliothèque de l'Université 1220, a breviary for the use of Paris dating from

41 H.B.T., *La vie, martyr, translation, et miracles des martyrs-saints Can, Cantien, et Cantianne, leur soeur, les corps desquelz reposent en l'église collégiale de nostre Dame d'Estampes, le tout tiré des archives de la dicte Église* (Paris, 1610), 43.

42 Bonvoisin, 23–25, 27–30.

43 For the 1282 procession and translation, see H.B.T. 1610, 26–34 and Forteau 1909, 193–97. Forteau is transcribing the writings of Pierre Plisson, an Étampes resident documenting town affairs. Fleureau has this translation occurring in 1249 (1977, 359–61). Fleureau likely took his date from H.B.T., who used 1249 for this translation; however, they refer to Gilles, archbishop of Sens, as having sued Pierre Barbet, the archbishop of Reims (r. 1273–98). Gilles I Le Cornu was archbishop of Sens from 1241–54, and Gilles II Cornut from 1275–92. H.B.T. confused the former with the latter. The dated testimonials in the *châsse* have since been destroyed, but Plisson claimed to have witnessed them when the *châsse* was opened in 1672 (Forteau 1909, 207).

44 Can, Cantien, and Cantienne appear in martyrologies of Bede, Florus, Wandelbert, Rhabanus Maurus, Ado, Usuard, Notker, Petrus de Natalibus, and in the "Parvum Romanum." While they appear in at least two copies of the *Martyrology of Ado*, potentially produced in the Île-de-France before I propose that the relics were promoted at Étampes (Bibliothèque nationale de France lat. 5250, a 12th-century copy from Mantes, and Bibliothèque nationale de France lat. 5280, a 13th-century copy from Chartres), they also appear in multiple martyrology manuscripts produced in Burgundy, Switzerland, and elsewhere both before and after their supposed arrival in Étampes (Dom Henri Quentin, *Les martyrologes historiques du moyen age: étude sur la formation du Martyrologe Romain* [Paris, 1908], 223–42, 334, 411–13, 429, 467–68, 482).

the beginning or first half of the 13th century.[45] The three appear sporadically in breviaries produced in the Île-de-France after that date. Not until the 18th century do any breviaries for the use of Sens make reference to Sens's possession of relics from Can, Cantien, and Cantienne. While a Sens breviary of 1780 ties the relics' arrival at Étampes and at Sens to Robert the Pious (a common local association by that point), Bonvoisin's specifics about Léothéric taking a jawbone are not substantiated in that account.[46]

The absence of evidence indicating the presence of these relics prior to the beginning of the 13th century supports the possibility that the chapter of Notre-Dame acquired or invented the relics around that time. Alternatively, perhaps they had a new impetus to publicize the presence of the relics in the 13th century. The association with Robert the Pious may reflect historical truth; may have been a convenient means of providing a pedigree; or may have simply emerged as a logical correlation between the assumed founder of the church and the relics. Regardless of how the relics arrived in Étampes, their rising prominence seems remarkably fortuitous for a church that had need of attracting new visitors. To the canons of Notre-Dame, Can, Cantien, and Cantienne would have been desirable patrons, as they were prestigious early Christian martyrs with ties to the imperial family whose acquisition could be associated with their supposed royal founder. Their names were known in France from an early date and thus might not be completely unfamiliar to a local audience. In his 6th-century *Vita* of Saint Martin of Tours, Fortunatus writes that those who reach Aquileia will venerate the Cantiens, and, as noted above, they do appear in some early martyrologies produced in France.[47] Furthermore, a legend indicates that Jacques l'Hermite (Saint James of Sasseau) received some of their relics as a gift from Pope Sergius II in the 9th century and deposited them in a chapel at Sasseau, near Bourges.[48] The relics at Sasseau were no competition for those at Étampes, however. The initial relic holdings at Notre-Dame must have been substantial, as at the 1672 opening of *châsse*, a town doctor recorded the presence of lower and upper leg bones, skull bones, jawbones (plural, even absent one claimed by Sens), vertebrae, an arm, and many smaller bones and scraps of cloth. This was after the attack on the *châsse* by Huguenots in 1562,

45 Victor Leroquais, *Les Bréviaires manuscrits des bibliothèques publiques de France*, vol. 4 (Paris, 1934), 27.

46 *Breviarium Senonense*, vol. 2 (Sens, 1780), 498.

47 Gineste 2012; Venantius Fortunatus, *Venantii Honorii Fortunati, Pictaviensis episcopi: Opera* (Cambrai, 1822), 94.

48 A. Boulé, "Du culte des martyrs Saint Can, Saint Cantien, et Sainte Cantienne leur soeur dans le Berry," *Bulletin de la Société historique et archéologique de Corbeil, d'Étampes, et du Hurepoix* 12 (1906): 6–9; Felix Pallet, *Nouvelle Histoire du Berry*, vol. 5 (Bourges, 1785), 201.

when its contents were scattered and the townspeople had to gather what remained for a retranslation.[49] Notre-Dame d'Étampes's claim to possess the three martyrs competed with churches in Milan[50] and San Canzian d'Isonzo, outside Aquileia.[51] While three bodies could presumably be divided over numerous locations, each site claims (or once claimed) to have the majority of Can, Cantien, and Cantienne's remains. However, these sites were distant enough to avoid a blatant contradiction of Notre-Dame's rights to the relics. Can, Cantien, and Cantienne served Notre-Dame well, becoming a reliable source of income. By the beginning of the 16th century, the chapter earned about one hundred livres per year from pilgrims' donations.[52]

As the cult developed, Can, Cantien, and Cantienne benefited the church in other ways as the canons used the saints to forge connections with the Virgin and to indicate primacy over other local churches. The legend of Sulpicia's miracle indicated that the intervention of the three martyrs was connected to the Virgin's intercession. The reliquary of Can, Cantien, and Cantienne described by antiquarian Dom Basile Fleureau in the 17th century was likely made in the 14th, as it had the arms of the count of Étampes from the house of Evreux, and the imagery juxtaposed Can, Cantien, and Cantienne with the Virgin and other locally revered saints. One gable depicted Christ as Salvator Mundi; the opposite gable showed the Virgin enthroned as the Queen of Heaven. In the 16th century, four saints associated with local church dedications were added to the corners of the *châsse*: saints Peter and Martin nearest the Virgin, and Giles and Basil nearest Christ.[53] Each long side of the *châsse* had five niches with selected apostles on one side and Can, Cantien, Cantienne, and their companions Sisinius and Protus on the other. The *châsse* was crowned by another image of the Virgin.[54]

The church's new west façade played a role in a yearly liturgical procession that also asserted Notre-Dame's status. On Easter Monday, the large *châsse* and a smaller wooden *châsse* were brought to the west portal of Notre-Dame to be exposed to the faithful overnight. In the morning, the town assembled for the procession, with the *curés* of each parish near the corners of the *châsse* marked

49 Forteau, 197–98, 210–11.

50 Fleureau, 358.

51 Mario Mirabella Roberti, "La basilica paleocristiana di San Canzian d'Isonzo," *Aquileia Nostra* 38 (1967): 59–86.

52 Maxime Legrand, "Comte des recettes et dépenses de la fabrique de l'église collègiale de Notre-Dame d'Étampes," *Annales de la Societé historique et archéologique du Gâtinais* 25 (1907), 84.

53 Fleureau, 359.

54 Fleureau, 363.

by their respective patron saints. The procession passed from the west entry of Notre-Dame as far as the church of Saint-Martin, returning along the rue Saint-Jacques and behind the church of Saint-Basile to Notre-Dame.[55] Notre-Dame had no enforceable claim over any of the other local churches referenced on its *châsse*, but the inclusion of these sites in a processional route beginning and ending at Notre-Dame—and their eventual addition to the *châsse* itself—indicated an aspirational hierarchy headed by Notre-Dame and its patrons.

Notre-Dame d'Étampes would be far from the only church of its era to promote a cult with the goal of encouraging pilgrimage. The new emphasis on Can, Cantien, and Cantienne, and the related façade situate Notre-Dame as trailing the 11th- and 12th-century boom in new or remodeled churches along the roads to Santiago. The development of Notre-Dame's cult in the course of the 13th and 14th centuries, when connections between the three martyrs and the Virgin Mary were emphasized, also echoes late medieval trends favoring universal, as opposed to strictly local, cults.[56]

4 Conclusion: Ongoing Transformation

In the course of the 12th century, the expansion of the church of Notre-Dame was primarily addressed to a royal audience. The canons, some with royal ties themselves, oversaw a building connoting royal prestige through its geographical placement and prominent portal imagery. In the 13th century, however, Notre-Dame found itself without a consistent royal presence, and the church likely sought to maintain its status by adapting its structure to attract pilgrims. The 13th-century campaign transformed Notre-Dame from a foundation that spoke rather specifically to and about royalty into a building that actively sought to draw pilgrim traffic. The three new western portals, two of which were elaborately sculpted and projected outward toward the view of travelers turning from the rue Saint-Jacques; the higher walls that helped to unify the church's appearance and differentiate it from its nearby rivals; the sculpted tympanum emphasizing the majesty of the Virgin and highlighting the pilgrim-like actions of the Magi; and the new chapels in the nave collectively demonstrate a reimagining of the foundation's mission. The emergence of the cult of Can, Cantien, and Cantienne over the course of the 13th century suggests that the arrival or advertisement of the relics coincided with the new construction. If the canons

55 H.B.T., 49.

56 Barbara Abou-el-Haj, *The Medieval Cult of Saints: Formations and Transformations* (Cambridge, 1997), 31.

did not invent the relics, they seem to have grasped their potential as a means of generating devotional visits, as the saints became central to the church's mythology from the 13th century onward. Whether the relics were in Étampes prior to the façade addition, were brought in after, or arrived in concert with the façade's creation, their promotion complemented the aims of the new construction.

A study of Notre-Dame in the 13th century reveals not only the extent and inspiration of an extensive remodel; it also suggests ways that past campaigns may shape future work. The presence of the royal south portal did not preclude the reconfiguration of the church for successive audiences. In fact, the strong visual association between the south portal and the royal palace may have been perceived as exclusive and may only have encouraged the canons of Notre-Dame to openly announce their welcome for other kinds of visitors via new western construction once royal attention was diverted elsewhere. The state of Notre-Dame at the close of the 12th-century campaigns—emphatically focused on space for the college, its main portal turning toward the palace in both direction and subject—engendered a need for change at the start of the next century to increase chances for successfully attracting new viewers.

In the centuries that followed, the canons continued to adapt the ecclesiastical space and its décor according to changing trends and circumstances by, for example, commissioning a life-sized sculpture of the Entombment in the beginning of the 16th century.[57] This longer view of the life of Notre-Dame demonstrates a building in relation not to a single personality or a single stylistic phase but as an entity reflecting the mutable concerns of the society that produced it—and that, with the ongoing use and restoration of the building, continues to redefine the vision of a medieval church.

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57 Legrand, 110.

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CHAPTER 15

Design in the Details: The Choir of the Cathedral of Clermont-Ferrand

Michael T. Davis

> Construction is the architect's mother tongue; the architect is a poet who thinks and speaks in construction.[1]

My essay builds on the insights of William W. Clark and Carl F. Barnes, Jr. in this volume that pays tribute to their contributions to the history of medieval architecture.[2] Both were notably alert to the processes of construction that brought buildings into being. Clark's body of scholarship embraces Gothic architecture in its manifold complexity, setting it within the large-scale context of the contemporary intellectual landscape, sorting out construction histories, or extracting the manifestation of historical memory from form and materials.[3] He has also been attentive to the inventive hybrid seen, for example, in the willful combination at Saint-Pierre, Lisieux of "a Romanesque wall system that … is concealed by the artful application of Gothic decorative forms according

1 Auguste Perret from Peter Collins, *Concrete: The Vision of a New Architecture; A Study of Auguste Perret and His Precursors* (New York, 1959), 199.

2 Thanks to my colleagues in the "All Things Stone" group who have joined in lively discussion of the question of "what did medieval architects do?" and listened constructively to my developing thoughts on Clermont. Nicola Coldstream's scholarship and comments have been continual sources of insight. Nancy Wu shared her knowledge of the design and construction history of Reims and collaborating with Stefaan Van Liefferinge on Clermont has stimulated my thinking about the cathedral and the skill of its designer. Finally, thanks to Mailan Doquang for her work and photographs on the chantry chapels of Notre-Dame, Paris.

3 Charles Radding and William W. Clark, *Medieval Architecture, Medieval Learning: Builders and Masters in the Age of Romanesque and Gothic* (New Haven, 1992). The two volumes on Laon Cathedral, William W. Clark and Richard King, *Laon Cathedral, vol 1: Architecture* (London, 1983) and Clark, *Laon Cathedral*, vol. 2: *Architecture: The Aesthetics of Space, Plan, and Structure* (London, 1987) take a monographic approach to the cathedral, its construction history, and stylistic context. William W. Clark, "'The Recollection of the Past Is the Promise of the Future.' Continuity and Contextuality: Saint-Denis, Merovingians, Capetians, and Paris," in *Artistic Integration in Gothic Buildings*, ed. V. Raguin, K. Brush, and P. Draper (Toronto, 1995), 92–113.

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to the native Anglo-Norman logic of visual articulation."[4] He reveals the 12th-century choir of Saint-Germain-des-Prés as a carefully orchestrated composition measured out by piers and capitals in a "system used by the builder to differentiate space."[5] In other words, Clark registers the human agency in the architectural enterprise, the thinking designer behind the finished building. Opening the pages of Villard de Honnecourt's Portfolio, he conjures up the memorable image of Villard stationed high up among the flying buttresses of the choir recording the Reims Cathedral that *he* saw, attempting to capture the visual experience of a structure that combined curving arches, taut shafts, and daring perforation.[6]

In his studies of Soissons Cathedral, Carl F. Barnes, Jr. also found his way behind the scenes and into the workshop through discoveries of preparatory drawings engraved onto the floor of the northwest tower and the south transept tribune wall. They marked various stages of design development ranging from the rough sketch of a rose window, showing radii and concentric rings of oculi, to the carefully executed representation of a four-light tracery window.[7] But it was in pursuit of Villard de Honnecourt that he wrestled with the spectrum of conceptual, aesthetic, and technical aspects of Gothic architecture. Whatever one's conclusions about Villard as a person and a professional, whether he was a master mason, a carpenter, a goldsmith, a sculptor, an agent of the Cambrai Cathedral chapter, or an inquisitive amateur, the architectural drawings that populate the Portfolio beckon the viewer—us—into an environment stocked with compasses and squares, ashlar blocks, plans, templates, and elevations.[8] The suite of drawings of Reims Cathedral on folios 30v-32v, plus Villard's "favorite window" on 10v, offer an unprecedented dossier of graphic views that, together, loosely translate the Vitruvian triad of plan (*orthographia*),

4 William W. Clark, "The Nave of Saint Pierre at Lisieux: Romanesque Structure in a Gothic Guise," *Gesta* 16 (1977), 29.

5 Ibid., "Spatial Innovations in the Chevet of Saint-Germain-des-Prés," *Journal of the Society of Architectural Historians* (38, 1979): 348–65, quotation at 349.

6 Ibid., "Reims Cathedral in the Portfolio of Villard de Honnecourt," *Villard's Legacy: Studies in Medieval Science, Technology and Art in Honor of Jean Gimpel*, ed. M.-T. Zenner (Aldershot, 2004), 23–51.

7 Carl F. Barnes, Jr., "The Architecture of Soissons Cathedral: Sources and Influences in the Twelfth and Thirteenth Centuries," PhD dissertation, Columbia University, 1967; "The Gothic Architectural Engravings in the Cathedral of Soissons," *Speculum* 47 (1972), 60–64. The rose window sketch has been the object of further study by Wolfgang Schöller, "Eine mittelalterliche Architekturzeichnung im südliche Querhausarm der Kathedrale von Soissons," *Zeitschrift für Kunstgeschichte* 43 (1980): 196–202.

8 Carl F. Barnes, Jr., *The Portfolio of Villard de Honnecourt* (*Paris, Bibliothèque nationale de France, MS Fr 19093): A New Critical Edition and Color Facsimile* (Farnham, 2009).

elevation (*ichnographia*), and perspective (*scaenographia*).[9] Folio 32r that sets out five pier sections—for the ambulatory, aisles, main arcade, crossing, and chapels—along with molding templates for the dado arcade, window tracery, formerets, and vault ribs is particularly significant (Figure 15.1). First, read in conjunction with the elevation views, this page suggests that a master plan for the cathedral had been worked out at the onset of construction because the catalog of forms recorded by Villard remained in force across multiple building phases supervised by successive master masons.[10]

Second, instead of ascribing the discrepancies between Villard's drawings and the realized cathedral to "error," "incompetence," "invention," or "improvement," what if we imagine two modes of project drawing, one pictorial, the other technical? The elevations and chapel perspectives present a generalized vision of the building while the pier sections and templates bring that image into focus with a nuts-and-bolts level of design that was the provenance of the

9 For Vitruvius, see Mark Wilson Jones, *Principles of Roman Architecture* (New Haven, 2000), chapter III, "The Dynamics of Design," 49–68. Roman architectural practice also used sections. For Villard's Reims drawings, consult Barnes, *The Portfolio*, 193–210; and Jean Wirth, *Villard de Honnecourt, architecte du XIIIe siècle* (Geneva, 2015), 228–41. Even though no plan of the cathedral appears in the Portfolio, *orthographia* might be read in the pier plans of 32r and it is possible that a plan was drawn on one of the leaves now lost. Villard states that his drawings of Cambrai include the plan of the chevet on folio 14v as well as interior and exterior elevations, renderings of the chapels and lateral walls, and what amounts to a section view of the flying buttresses ("vesci lesligement del chavec me dame Sainte Marie de canbrai ensi com il est de tierre avant en cest livre en trouveres les montées dedans et dehors et tote le maniere des capeles et des plain pans autresi et li maniere des ars boteres."). See Barnes, *The Portfolio*, 92–93 for the Cambrai plan and drawing captions. Richard of St-Victor's mid-12th-century commentary on Ezekiel's temple on the mountain offers a comparable presentation of a building through a collection of plan, frontal and lateral elevations, and section. See Walter Cahn, "Architecture and Exegesis: Richard of St-Victor's Ezekiel Commentary and its Illustrations," *Art Bulletin* 76 (1994): 53–68.

10 Wirth, *Villard*, 232, 238 surmised that Villard had access to construction drawings. He estimates (235, 269–72) that Villard visited Reims at the beginning of work on the nave in the late 1210s or early 1220s. Barnes, *The Portfolio*, 207–08, also asserts that Villard "was drawing from templates … and knew what some of them were for …" Placing Villard in Reims in the 1230s, he comments that the radiating chapels' templates would then have been two decades old and apparently old fashioned, but guesses that they were drawn because they were "new to him." However, Villard may have recorded a schedule of forms on 32r that remained in play over a period of three decades during construction of *both* the choir and eastern bays of the nave. See James Hillson, "Villard de Honnecourt and Bar Tracery: Reims Cathedral and Processes of Stylistic Transmission, *c.*1210–40," *Gesta* 59 (2020): 169–202 for fresh thoughts on the nature of the information contained in the Portfolio and 196–97 for an analysis of the position marks inserted into the 32r drawings by a later hand.

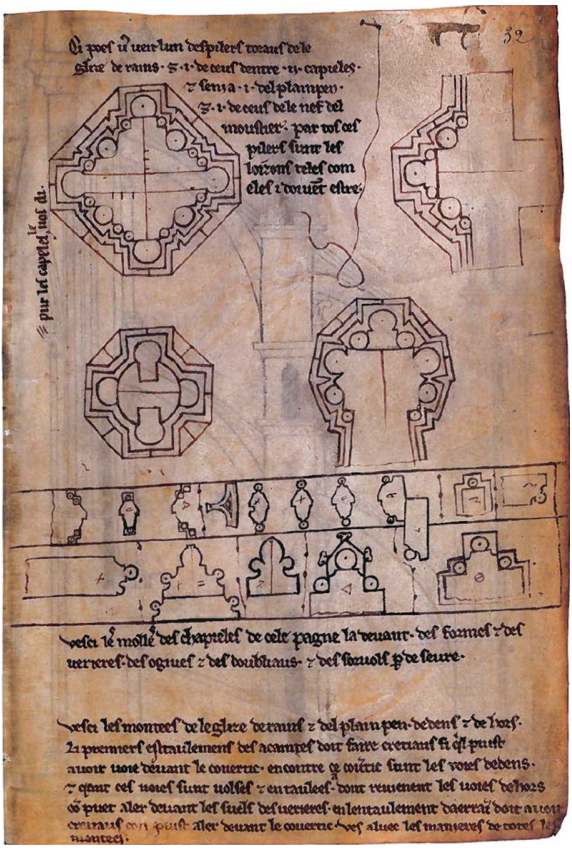

FIGURE 15.1 Portfolio of Villard de Honnecourt, fol. 32r: pier sections and molding templates for Reims Cathedral (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

architect: the composition, fabrication, and assembly of piers, windows, and vaults, the primary components of its structure. Such practice is clear from documents of the Troyes Cathedral crossing tower project. In 1412–13, Jehan de Nantes, Thomas Michelin, Remon Pirenne, and Nicholas Ladvocat were paid "to draw out the form of the base of the tower in general terms." However, the disposition of windows and formal details all remained to be determined.[11]

In this study, I draw upon William Clark's method of analysis of the abbey church of Saint-Germain-des-Prés in Paris as well as the implications of

11 Stephen Murray, *Building Troyes Cathedral: The Late Gothic Campaigns* (Bloomington, 1987), 59–60, 141–43.

Villard's Reims drawings to reimagine the design thinking of the builders, working a century later, of the choir of the Cathedral of Notre-Dame in Clermont-Ferrand.[12] Looking behind the layers of symbolic meaning, social context, or political signification, what can the physical fabric can tell us about what was on the architect's mind as he drew out templates, composed pier sections, and fine-tuned moldings? My agenda here is slightly different than tracking forms in order to identify a building's origins or to reimagine a master mason's professional biography, although key elements of the cathedral do point to a specific architectural context from which its scheme emerged. A consideration of details suggests that the initial phases of the construction of the Clermont choir were guided by a coherent overall vision distinguished by a distinctive conception of structure and space. In concentrating on the task of design—the production and assembly of forms—I want to return the monument itself to center stage to consider the character of the physical and visual framework that conditioned reception then signification.[13]

As is the case today, the architectural processes of the 12th and 13th centuries were both energetically collaborative and highly variable. Judging from the accounts in his *libelli*, Suger was a famously hands-on client, demanding that his builder base the abbey church's new structure on the anachronistic column to achieve a formal, but also a symbolic, integration with the early medieval edifice.[14] On the other hand, the crossing tower project at Troyes Cathedral, mentioned above, that extended from 1412 to 1433 tells the tale of a collective creative process. Meetings were held "in the chamber of our lord the king, in the chapter, in the bishop's palace with the clergy, bourgeois, and inhabitants of Troyes always present," a master carpenter was "elected" by the city's residents, trips to Bourges, Mehun-sur-Yèvre, and Paris were undertaken by both craftsmen and administrators to study exemplary models, a debate among the artisans considered whether one or two levels of windows were preferable, and

12 Construction of the Gothic cathedral is reported to have begun in 1248. Work reached the area around the south transept by 1273 and the choir clerestory glass has been dated to the 1270s. See Anne Courtillé, *La Cathédrale de Clermont* (Nonette, 1994), 54–59; 145–49 for the glass; idem, "La cathédrale gothique," *Clermont: l'âme de 'Auvergne* (Strasbourg, 2014), 53–83; and Karine Boulanger, "Les vitraux anciens," 189–201 in the same volume; Michael T. Davis, "Guidelines: the Bishop's Garden, a Mason's Drawings, and the Construction of Notre-Dame Cathedral of Clermont," *Patrons and Professionals in the Middle Ages*, ed. P. Binski and E.A. New, Harlaxton Medieval Studies 22 (Donington, 2012), 167–81.

13 Brigitte Bedos-Rezak, "Towards a Cultural Biography of the Gothic Cathedral: Reflections on History and Art History," *Artistic Integration*, 266–67.

14 *Abbot Suger On the Abbey Church of St-Denis and Its Art Treasures*, ed. E. Panofsky and G. Panofsky-Soergel, 2nd ed. (Princeton, 1979), 90–93; also Clark, "'The Recollection of the Past," 92–113.

Jehan Guerart, the duke of Berry's master of the works was consulted "on the making of windows, pinnacles, and balustrades of the said bell tower."[15]

Then there is Clermont, where a 1273 agreement between the cathedral chapter and bishop acknowledged that the extension of the new cathedral would follow the "form, style, and dimensions of the structure now begun" (*formam, modum, et dimensionem fabrice iam incepte*). While this accord settled the footprint of the building and even called for stylistic harmony, there is no indication that the clergy sought to monitor the details: above all the bishop was concerned to finalize conditions of access into the cathedral through the south transept; the chapter wanted to make sure that the buildings of the episcopal palace would not block the chapel windows.[16] If the stylish rayonnant cathedral aimed "to imitate the noble and magnificently constructed churches which had been built … in the kingdom of France," this reflected the ambitions of the bishop and chapter. Their political and ecclesiastical calculations must have guided the initial selection of a northern master rather than any particular charge inherent in his ultimate choice of pier forms or moldings. Once construction was underway, the master mason, believed to be Jean Deschamps, like William of Sens at Canterbury, was apparently left to his creative devices, "preparing all things that were needful for the work … (he) delivered molds for the shaping of stones to the sculptors who were assembled, and diligently prepared other things of the same kind."[17]

So what were the *formam et modum* of the architect of the Clermont choir? At urban scale, the cathedral plan responded to the constraints of the site: adjacent streets, a cemetery, and the bishop's palace limited the expansion of

15 Murray, *Building Troyes Cathedral*, 59–60, 142–45 for the design and construction of the crossing spire.

16 The texts of 1273 documents have been published by Davis, "Guidelines," 180–81. See also the discussion of the terms *forma* and *modus* by Paul Binski, *Gothic Wonder: Art, Artifice, and the Decorated Style, 1290–1350* (New Haven, 2014), 64–66. Binski writes, "Such versatile terms (as *forma* and *modus*) are of interest precisely because they move between the spheres of theory and practice and like the term *opus*, cross the boundaries of different activities, whether they be textual, architectural or pictorial. This is one reason why the domain of theory and practice cannot be artificially separated." Be that as it may, in my opinion, these words appear to concern the general appearance of the building rather than specific details. Nicola Coldstream remarks, "Architectural Designers in the Thirteenth Century," *Thirteenth-Century England IX: Proceedings of the Durham Conference, 2001* (Woodbridge, 2003), 206, "Medieval design and building were essentially neither scholastic nor theoretical." See also the careful observations on architectural technique by Jean-Marie Guillouët, "In the Masons' Yard: Insights from French Gothic Manuscript Painting," *Gesta* 52 (2013): 181–96.

17 This excerpt of Gervase of Canterbury's account of the fire at and rebuilding of Canterbury Cathedral is taken from *Gothic Art 1140–c.1450*, ed. T. Frisch (Englewood Cliffs, 1971), 17.

the choir, eliminated the possibility of a projecting transept, and dictated the location of the Gothic crossing and transept portals.[18]

The building is set on a great church plan that accommodated all of the functional requirements of the clergy: canons' stalls ranged along the three-bay choir, the high altar was the centerpiece of the seven-segment hemicycle; a continuous string of chantry chapels, five polygonal opening off of the ambulatory, four rectangular on the south aisle and two on the north side, provided memorial spaces and devotional nodes for the celebration of saints' feasts; the sacristy with a treasury above occupied the middle pair of bays on the north (Figure 15.2).[19] This arrangement, which significantly altered the established liturgical topography of the cathedral and involved the demolition of the early medieval crypt and the consolidation of its altars into the new Gothic church, would no doubt have been settled at the outset of planning in conversations between builder and building committee.[20]

1 Piers

In 1965, Robert Branner wrote with characteristic insight, "The originality of Clermont does not depend upon the combination of up-to-date details alone, however, but also on the way such details were made to serve the general conception of the monument."[21]

This "general conception" is in no small part due to the arrangement of piers, moldings, and tracery that articulates the relationships between solid structure, pervasive space, and luminous surfaces of glass.

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18 For the environs of the cathedral, Gilbert Rouchon, *Notre-Dame de Clermont, son chapitre, son quartier* (Clermont-Ferrand, 1934), 57–59; 123–39; Davis, "Guidelines," 170–71 and pl. 11.

19 The cathedral's liturgy is mapped out in the early 14th-century Coutumier, Bibliothèque du patrimoine de Clermont-Ferrand, MS 56. See also Abbé Raphanel, "Les anciens usages liturgiques du diocèse de Clermont," *Semaine religieuse du diocèse de Clermont* 33 (1901): 341-–53, 361–69, 401–11, 441–49, 621–29, 1021–35 and 34 (1902): 41–54, 141–49, 201–11, 221–32, 261–70, 1001–11; and more recently, Henri Hours, "Culte et dévotions au Moyen Âge," *Clermont: l'âme de l'Auvergne*, 318–22.

20 For the Romanesque cathedral and its crypt, consult the studies of Pascale Chevalier, "La crypte de la cathédrale de Clermont: nouvelles approches," *Les Cahiers de Saint-Michel de Cuxa* 32 (2001): 133–46; and "Le temps long des archéologues," *Clermont: l'âme de l'Auvergne*, 27–38; Arlette Maquet, "La crypte de la cathédrale de Clermont: sources médiévales et modernes," in *Sculptures médiévales en Auverge: Création, disparition et réapparition*, ed. A. Regond and P. Chevalier (Clermont-Ferrand, 2008), 33–42; Courtillé, *La cathédrale*, 9–33.

21 Robert Branner, *Saint Louis and the Court Style in Gothic Architecture* (London, 1965), 99.

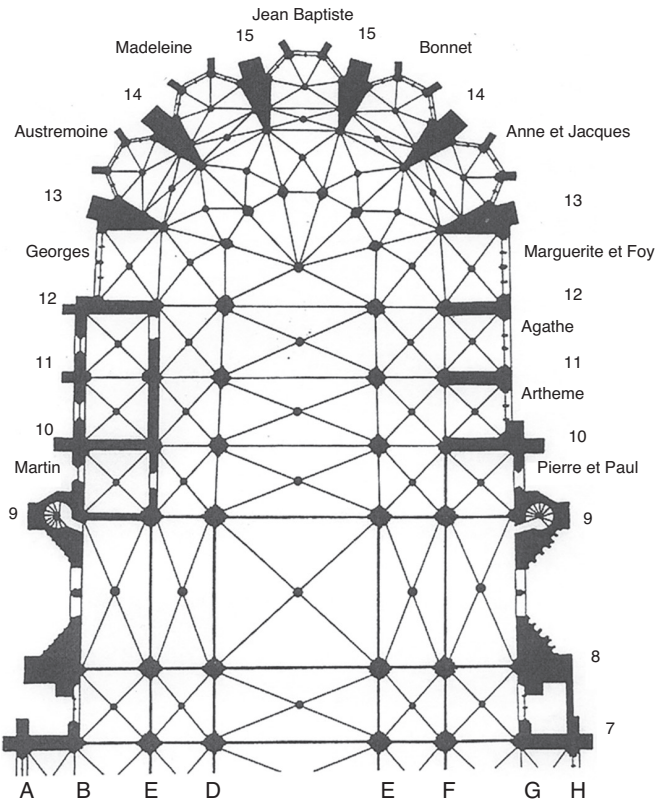

FIGURE 15.2 Clermont-Ferrand, Cathedral of Notre-Dame: plan of choir and transept (D. Fiegenschue and M. Davis, reworked after A.-G. Mallay)

From the "great church" plan, Jean Deschamps generated the cathedral's structural footprint by reflecting the vaults downward into the pier configuration. This approach produced a dozen different pier and respond forms in the choir that precisely define each of the constituent cells of the plan and interior space: the polygonal radiating chapels and turning bays of the ambulatory; the rectangular chapels and aisle bays; the hemicycle; the choir; the crossing and its chapels. The variety of the Clermont choir supports runs counter to contemporary design trends which moved toward the standardization of a limited number of profiles.[22] It does not appear to be motivated by

22 Dieter Kimpel and Robert Suckale, "Le dévelopement de la taille en série dans l'architecture médiévale et son rôle dans l'histoire économique," *Bulletin monumental* 135 (1977): 95–222; Christian Freigang, "Changes in Vaulting, Changes in Drawing. On the

the intention to mark off liturgical zones through changes in form and decoration that Clark signaled at Saint-Germain-des-Prés and that was often found elsewhere.[23]

The intimate relationship between structure and space in the Clermont choir points to a design scheme, thought through down to the details, that encompassed the choir. The handling of the coping of the extrados of the lower rank of the hemicycle flying buttresses that knifes through the clerestory jambs to notionally tie the exterior armature of support to the interior frame succinctly captures the architect's approach[24] (Figure 15.3). Although the foliate capitals and differences in profile maintain the traditional separation of support shaft and rib at Clermont, the rigorous coordination of colonnettes with vault elements, both with a similar plastic value, insists on the visual continuity of the structural framework (Figure 15.4). Finally, by coordinating the height of the capitals of the chapel windows and vault responds, the Clermont master redefined the character of the window. Rather than a semi-independent network of tracery filling a void, as at Reims, Amiens, the new work at Saint-Denis, or the Sainte-Chapelle, the mullions were fully integrated with the scaffolding composed of colonnettes and vaults. This same alteration had been made in the sequence of lateral chapels on the north side of the nave at Notre-Dame in Paris in which the autonomy of parts that characterized chapels 1–4 was replaced by an integration of components in chapels 5–7 erected *c*.1245–55.[25]

Visual Appearance of Gothic Architecture around the Year 1300," in *The Year 1300 and the Creation of a New European Architecture*, ed. A. Gajewski and Z. Opacic (Turnhout, 2007), 67–77.

23 As Coldstream, "Architectural Designers," 207, writes, "The liturgical divisions of a great church would be prescribed by the patron, although the idea of marking them by changes in decoration which occurs at Salisbury, was so widespread by the thirteenth century that a master mason would not have to be reminded about it." Eric Fernie, "The Use of Varied Nave Supports in Romanesque and Early Gothic Churches," *Gesta* 23 (1984): 107–17, discussed the role of piers to indicate liturgical division, while Dieter Kimpel and Robert Suckale, *Die gotische Architektur in Frankreich 1130–1270* (Munich: Hirmer Verlag, 1985), esp. 56–64, posited a hierarchy of forms aimed to distinguish the nave from the choir at Amiens Cathedral, an hypothesis contested by Stephen Murray, *Notre-Dame, Cathedral of Amiens: The Power of Change in Gothic* (Cambridge, 1996).

24 The lower flyer is aligned with the high capitals of the vault respond and the extraordinary care taken to weave this molding into the clerestory wall seems a conscious attempt to visualize the exterior-interior connection.

25 Mailan S. Doquang, "The Lateral Chapels of Notre-Dame in Context," *Gesta* 50 (2011): 144–47; and Dieter Kimpel, *Die Querhausarme von Notre-Dame zu Paris und ihre Skulpturen* (Bonn, 1971), 30–34.

FIGURE 15.3 Clermont-Ferrand, Cathedral of Notre-Dame: section of choir with detail of lower flyer of hemicycle (south side bay 13) (D. Fiegenschue and M.T. Davis after Mallay and Rapin)
PHOTO: AUTHOR

Turning to the interior, each pier type responds to its specific spatial location, but the multiplication and repetition of identical slim colonnettes creates a rippling procession of shafts that sweeps through and unifies the ground floor. For example, the circular cluster of seven ambulatory pier colonnettes repeats the radial array of ribs formed by the vaults of the ambulatory and the tight rectangular bay that fronts the polygonal chapel (Figures 15.4 and 15.5A). This unusual "forebay" creates a deep chapel, emphatically set off from the ambulatory, perhaps intending to enhance the sense of privacy.[26] Plain lateral walls reveal the mass of the buttress and continue in the unadorned dado to frame the interior chapel space in a robust mural package.[27] In turn, the colonnettes, stringcourse,

26 Deep chapels separated from the ambulatory by a quadripartite vaulted bay appear at Saint-Julien, Cathedral of Le Mans, but the piers and wall articulation are treated in a completely different manner.

27 A rich ensemble of narrative and votive paintings adorned the walls of the chapels. The masonry itself appears to have been painted a grayish white with false joints outlined in red and white for which see Courtillé, *La cathédrale de Clermont*, 169–93; and by the same author, "Les peintures murales du Moyen Âge," *Clermont: l'âme de l'Auvergne*, 172–87. Also

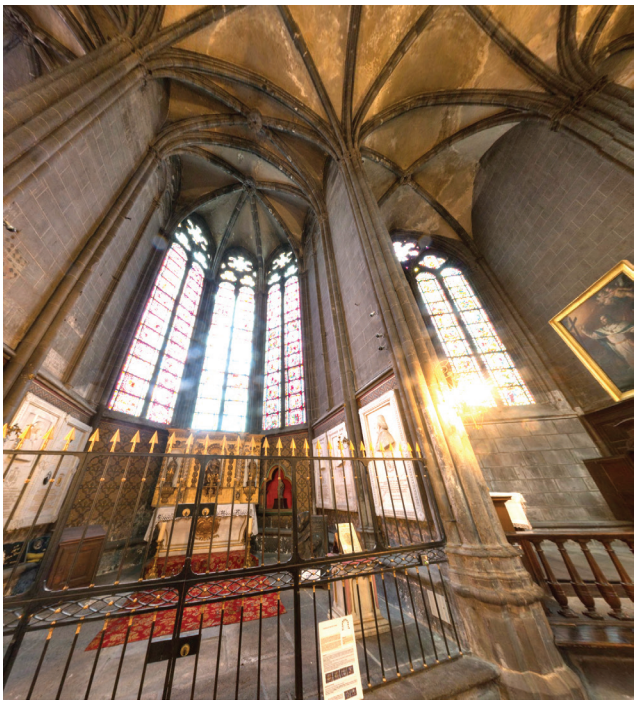

FIGURE 15.4 Clermont-Ferrand, Cathedral of Notre-Dame: ambulatory chapels of (L-R) SS. Anne et Jacques and SS. Marguerite et Foy
PHOTO: STEFAAN VAN LIEFFERINGE. IMAGE COURTESY OF THE MAPPING GOTHIC PROJECT, MEDIA CENTER FOR ART HISTORY. © THE TRUSTEES OF COLUMBIA UNIVERSITY

and ribs form a cage, slipped over the masonry, that marks a sequential transition from the solid surfaces of the threshold to the blind tracery pattern emerging from an eroding wall, and finally to the luminous trio of windows that surrounds the altar (Figure 15.4). This skillful choreography of structure and decoration, solid and void, dark and light set up a scaffolding for spiritual transformation by addressing the task, in Brigitte Bedos-Rezak's words, "of making the visible legible … through its own laws of signification, in relation to the agents of its production and consumption and thus demands interpretation."[28]

Michael T. Davis, "Frames of Vision: Architecture and Stained Glass at Clermont Cathedral," *The Four Modes of Seeing: Studies in Honor of Madeline Caviness*, ed. E.S. Lane, E.C. Pastan, E. Shortell (Farnham, 2009), 205–11 for the interaction of architecture, wall painting, and stained glass in the chapels.

28 Bedos-Rezak, "Towards a Cultural Biography," 266–67.

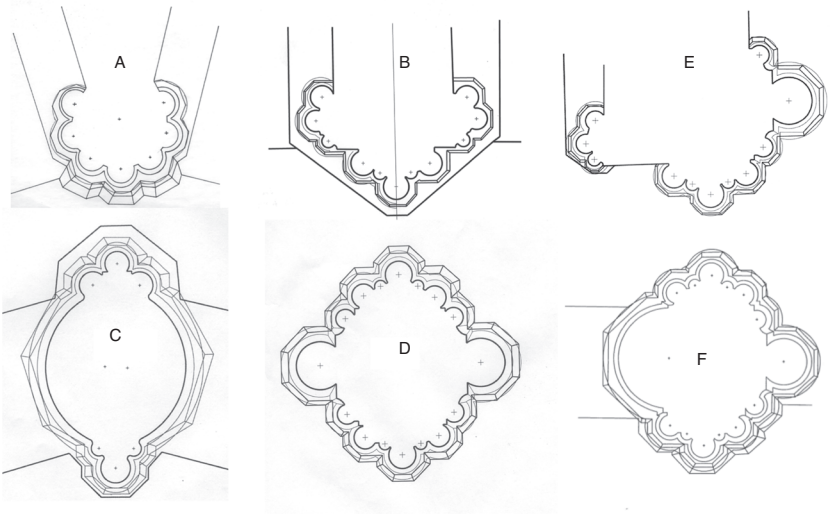

FIGURE 15.5 Clermont-Ferrand, Cathedral of Notre-Dame: schedule of choir piers: (A) ambulatory pier; (B) choir aisle pier; (C) hemicycle pier; (D) main vessel pier; (E) pier F10; (F) piers D and E 12
PHOTO: AUTHOR

The quadrilateral chapels and aisle bays to the west (10–12) are defined by piers assembled from the responds of their vaults, separated by masonry strips that reveal the inner face of the buttress walls (Figures 15.5B and 15.6). Their distinctly different form when compared to the ambulatory supports stems from their spatial context rather than liturgical expression. The likely model for this segmented design is the Notre-Dame piers formed by the insertion of chapels between the nave buttresses between *c.*1225 and 1255 that united the 12th-century engaged columns supporting the aisle vaults with the responds of the new chapels (Figure 15.7). As in the radiating chapels, the side walls and dado of the aisle chapels remain undecorated, save for votive paintings that have recently been uncovered, the four-part vault forming a simple canopy supported by single shafts at the corners and opening into the expansive screen of glass across the end wall.

Surveying the cathedral's main vessel, we find that instead of the uniformity, signaled by Clark at Saint-Germain-des-Prés and that continued at Chartres, Soissons, Reims, Amiens, and Beauvais through a repetition of the column and its *pilier cantonné* variants, the Clermont architect juxtaposed two distinctive spaces. Six elliptical columns, a single shaft pushed forward on the inner face, circle the main altar (Figures 15.5C and 15.8). Their slim profiles and the hemicycle arcades open an expansive view to the faceted glass walls of the chapels and a panorama of sacred history that encompasses stories of John the Baptist, Christ, miracles of the Virgin, and the lives of saints both international

FIGURE 15.6 Clermont-Ferrand, Cathedral of Notre-Dame: choir, south aisle
PHOTO: STEFAAN VAN LIEFFERINGE. IMAGE COURTESY OF THE MAPPING GOTHIC PROJECT, MEDIA CENTER FOR ART HISTORY. © THE TRUSTEES OF COLUMBIA UNIVERSITY

and local (Figure 15.9).[29] As the rib colonnettes ascend, they pass *through* the stringcourse at the base of the triforium, which establishes a horizontal line that pulls the seven bays of the hemicycle together (Figures 15.9 and 15.10). The continuous glass of the clerestory, featuring colored band windows on

29 For the cathedral choir's stained glass, Henri du Ranquet, *Les vitraux de la cathédrale de Clermont-Ferrand* (*XIIe, XIIIe, XIVe, xv siècles*) (Clermont-Ferrand, 1932); Courtillé, *La cathédrale de Clermont*, 110–49; Jean-François Luneau, "Les vitraux de la cathédrale de Clermont-Ferrand. État de la question," *Congrès archéologique de France* 158 (2000): 153–57; and most recently Karine Boulanger, "Clermont-Ferrand, cathédrale Notre-Dame," *Les vitraux d'Auvergne et du Limousin*, ed. F. Gatouillat and M. Hérold, Corpus Vitrearum recensement des vitraux anciens de la France 9 (Rennes, 2011), 123–52.

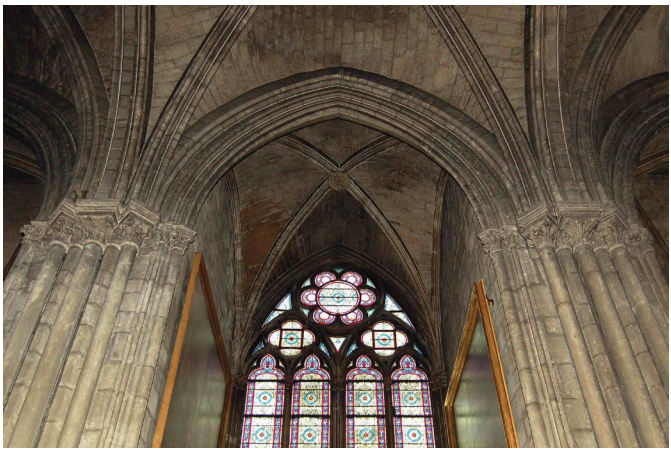

FIGURE 15.7 Paris, Cathedral of Notre-Dame: nave, north aisle, chapel 6
PHOTO: MAILAN S. DOQUANG

FIGURE 15.8 Clermont-Ferrand, Cathedral of Notre-Dame: choir interior
PHOTO: AUTHOR

FIGURE 15.9 Clermont-Ferrand, Cathedral of Notre-Dame: choir, hemicycle PHOTO: LINDSAY COOK AND ANI KODZHABASHEVA. IMAGE COURTESY OF THE MAPPING GOTHIC PROJECT, MEDIA CENTER FOR ART HISTORY. © THE TRUSTEES OF COLUMBIA UNIVERSITY

a grisaille field that enact the Assumption of the Virgin flanked by Apostles, fashions a monumental lantern to spotlight the high altar.

The three choir bays to the west change rhythm to feature compound piers of 16 shafts: responds of three support the arcade moldings springing to the east and west while groups of five colonnettes coordinate with the ribs of the aisle and main vessel vaults (Figures 15.5D and 15.11).[30] The square footprint of these piers establishes a more emphatic bay division that is articulated in tall vertical sections. An insistent differentiation

30 The crossing piers are also composed of 16 shafts but feature thicker arch-bearing shafts on each of the four faces. This pier composition was used for both the main vessel and aisle supports of the nave.

FIGURE 15.10 Clermont-Ferrand, Cathedral of Notre-Dame: choir, triforium and clerestory of hemicycle bays D12–13, D13–14, D14–15
PHOTO: AUTHOR

between hemicycle and straight bays also appears at the cathedrals of Bayeux, Coutances, Le Mans, Rouen, and Troyes as well as at Saint-Denis, in some cases the product of discrete building phases, but in others a calculated design strategy.

The handling of the clerestory in the western choir bays complements the treatment of the piers to disrupt horizontal continuity and underscore the repetition of vertical units. Narrow wall strips separate the triforium and clerestory from the vault respond to create what Robert Branner termed "a recessed parti."[31] (Figures 15.10 and 15.11) Notably, installation of the new two-light tracery patterns at Notre-Dame produced exactly the same result, the continuous arc of glass in the apse giving way in the bays to the west to windows set into mural frames. However, whereas the exclusive use of a doublet composition at Paris, dictated by the cathedral's sexpartite vaults, established the unifying consistency of the clerestory throughout the interior, the Clermont designer increased the lights from two to three to maintain the definition of the constituent zones

31 Branner, *Saint Louis*, 21, 98–99. The design also appears at Agnetz (Oise), Léon Cathedral in Spain, and Westminster Abbey. At Clermont, the wall strips are 31 cm wide at the west margin of the hemicycle bay 12–13; 65–66 cm in bay 11–12; 38 cm in bays 10–11; and 47–48 cm in bay 9–10.

FIGURE 15.11 Clermont-Ferrand, Cathedral of Notre-Dame: choir, south side elevation
PHOTO: SAM SWEEZY

of the choir.[32] This tells us something about his creative powers of assimilation and his ability to translate ideas and effects from one context to another. One final detail reveals his subtlety of thought that was carried down into the level of fine detail. As revealed at bay division 12, the initial scheme interlaced the triforium stringcourse with the vault respond, the diagonal rib shafts passing through the molding as in the hemicycle, the thin intermediate colonnettes

32 The three-light pattern appears to be the result of a design change, one that, in my opinion, was made by the first master of the choir, Jean Deschamps. The initial conception envisioned four-light windows, drawings for which were made on the terrace pavement of the choir but ultimately rejected. See Davis, "Guidelines," 171–76.

FIGURE 15.12 Clermont-Ferrand, Cathedral of Notre-Dame: choir, north aisle, pier C12 base
PHOTO: AUTHOR

fused with the lip of the molding leaving only the transverse rib support to rise uninterrupted to the level of the high capitals (Figure 15.10). Each bay is thus crisply defined and, at the same time, integrated into an overall matrix woven from rigorously arranged vertical and horizontal members.

However, rather than remaining a series of contiguous concentric layers or sequential spaces, Clermont's interior is stapled together by remarkable hybrid piers (Figures 15.2, 15.5 E, F and 15.12). For example, the piers at bay division 12 (Figure 15.5F) splice a semicircular east face that mirrors the hemicycle supports onto a 13-shaft bundle identical to the piers to the west. C12 (Figure 15.12) negotiates the change in level from the bench of the radiating chapel of Saint-George, whose floor is set above the ambulatory, to the lower bench that runs along the sacristy wall. Pier F10 (Figure 15.5E) manages the transitions from the chapel space to the transept *and* the change in wall bench level by the combination of two-thirds of an aisle pier with the thicker three-column arcade respond of a main vessel pier. A distinctive architectural "voice" emerges in the way in which the variety of functional spaces and vault configurations were negotiated by an orchestration of pier design, moldings, and capitals that presented the building as an impeccably integrated whole within which each constituent element or zone is enunciated. Of course, every architect faced comparable challenges, but at Clermont they were solved with a singular sensibility. Whether or not one architect—Jean Deschamps?—personally supervised the construction of the entire ground floor of the choir and

the elevation of the hemicycle is undocumented.[33] However, a coherent, carefully coordinated design appears to have remained in force until the adjustment of the triforium molding at the west side of bay division 12 freed the five-shaft choir vault responds to rise unbroken and sharpen the bay division (Figures 15.10 and 15.11).

That the Clermont choir scheme was understood as a package that could, nevertheless, be customized and applied to different building situations emerges in following the subsequent appearances of its pier combinations. Not far from Clermont, the collegiate church of Saint-Victor et Sainte-Couronne at Ennezat (Puy-de-Dôme) follows the same support sequence as at the cathedral (Figure 15.13 A,B): a cylindrical array of shafts between the radiating chapels, elliptical piers in the hemicycle, and compound piers in the straight bays while the parish church of Notre-Dame in Ravel (Puy-de-Dôme) uses a segmented pier type to tie the vaults of the polygonal apse and transept arms to the rectangular bays of the main space (Figure 15.13C).[34] The mid 13th-century intervention at the abbey church of Sainte-Croix at Saint-Pourçain-sur-Sioule (Allier) rebuilt the main vessel of the choir with elliptical apse supports followed by a hybrid elliptical-compound pier, and compound piers in the bays to the west (Figure 15.13D).[35] The choir structure of Saint-Etienne, the Cathedral of Limoges (Haute-Vienne), often included in the *oeuvre* of Jean Deschamps, was based on versions of the Clermont ambulatory piers, the segmented aisle pier, a 16-shaft main vessel support, and a hybrid pier that mediated the spaces between the western choir chapel, the aisle, and the transept (Figure 15.13 15.5 E--G).[36] And when the Cistercian community of Valmagne

33 A Pierre Deschamps, *quondam magister edificii Claromontensis* and mentioned in a 1357 document, has sometimes been imagined as Jean's son and immediate successor, as in Henri du Ranquet, "Les architectes de la cathédrale de Clermont," *Bulletin monumental* 76 (1912): 82–85; and repeated by Jean Bony, *French Gothic Architecture of the 12th and 13th Centuries* (Berkeley, 1983), 416. This has been rightly questioned by Christian Freigang, "Jean Deschamps et le midi," *Bulletin monumental* 149 (1991), 273.

34 Ennezat and Ravel are included in Anne Courtillé, *Auvergne, Bourbonnais, Velay Gothiques: Les édifices religieux* (Paris, 2002), 231–42 and 332–40, respectively.

35 For Saint-Pourçain-sur-Sioule, Anne Prache, "L'église Sainte-Croix de Saint-Pourçain-sur-Sioule," *Congrès archéologique de France* 146 (1988): 367–78.

36 Christian Freigang, *Imitare ecclesias nobiles: Die Kathedralen von Narbonne, Toulouse und Rodez und die nordfranzösiche Rayonnantgotik im Languedoc* (Worms, 1992), 191–202 and 288–96 addresses the attributions of the cathedrals of Clermont-Ferrand, Limoges, Narbonne, Toulouse, and Rodez to a mason or masons named Jean Deschamps. See also, idem, "Jean Deschamps et le midi," 265–98; Michael T. Davis, "Le choeur de la cathédrale de Limoges: Tradition rayonnante et innovation dans le carrière de Jean Des Champs," *Bulletin archéologique du Comité des Travaux Historiques et Scientifiques*, n.s. 22 (1989): 51–114,

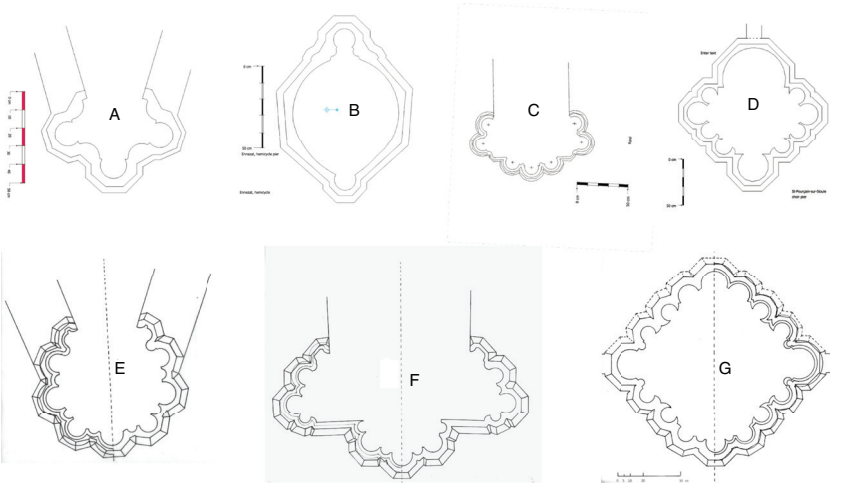

FIGURE 15.13 Variations on Clermont piers: (A) Ennezat, ambulatory; (B) Ennezat, hemicycle; (C) Ravel, north transept-nave corner; (D) Saint-Pourçain-sur-Sioule, hemicycle-choir pier; (E) Limoges Cathedral, ambulatory; (F) Limoges Cathedral, choir aisle; (F) Limoges Cathedral, choir main vessel
PHOTO: AUTHOR

in Languedoc (Hérault) went looking for a model for their church, they must have downloaded the Clermont design. Although the plan of Sainte-Marie increased the radiating chapels to seven and compressed the choir into one bay—the same catalog of piers in analogous locations organized and articulated the interior space (Figure 15.14).[37]

Given the range of ecclesiastical types—a parish church, a collegiate church, abbeys, cathedrals—and the nature of the threads that connect them, the transmission of ideas and information does not appear to have been enmeshed with the transfer of symbolic meaning nor the prestige of an exemplary model. Rather, the scheme developed at Clermont offered a syntax for the articulation of space that operated at the bedrock of architectural design and in the sphere of piers, moldings, and templates. This was a discourse carried on between building specialists that was both precise and fluid. While we might imagine that the single cathedral-type pier at Ravel could have been

esp. 110–15; and Yves Gallet, "Limoges, cathédrale Saint-Etienne. Le chevet rayonannt et le problème du gothique méridional," *Congrès archéologique de France* 172 (2014): 57–76.

37 Bony, *French Gothic Architecture*, 416–17, relates Valmagne to the "works of Jean des Champs." Also Vivian Paul, "The Abbey Church of Valmagne," *Mélanges à la mémoire du père Anselme Dimier*, 3 vols. (Arbois, 1982): 3:639–52; and Freigang, *Narbonne*, 323–30.

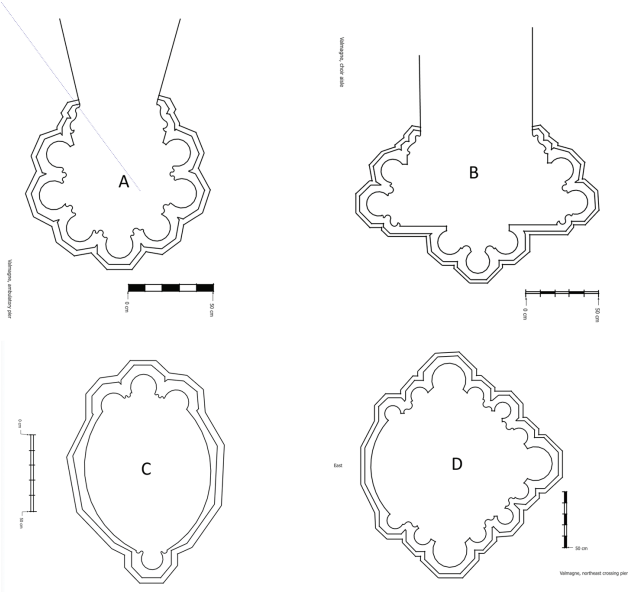

FIGURE 15.14 Valmagne, Abbey Church of Sainte-Marie: pier schedule: (A) ambulatory; (B) choi aisle; (C) hemicycle; (D) hemicycle-choir pier
PHOTO: AUTHOR

conveyed by a mason's memory, the replication of multiple, complex, idiosyncratic pier forms—elliptical, segmented, compound, hybrid—at Saint-Pourçain-sur-Sioule, Limoges, or Valmagne points to graphic representation as the most effective means of communication. Who could orally describe the design of Clermont piers D and E 12? Something along the lines of folio 32r of Villard's Portfolio could serve quite effectively as just such a catalog. On the other hand, the variations of the prototype—just as Jean Deschamps reworked the Notre-Dame aisle piers, Ennezat streamlined the cathedral's ambulatory supports—suggest that the patterns were relatively generalized and malleable.[38] Each master mason and workshop tackled the details of fabrication—colonnette diameters, shaft groupings—in the process of construction. That Clermont piers could be inserted into one-, two-, or three-story elevations reveals the latitude with which its schedule of structural components could be used.

38 Hillson, "Villard de Honnecourt and Bar Tracery," 182–202 for a thoughtful discussion of the strengths and weaknesses of graphic, linguistic, and personal means of stylistic transmission.

2 Context

In this essay, I have tried to spotlight the agency of the architect by approaching the choir of Clermont Cathedral as a primary document of thought and invention. Too often, such buildings, especially those whose masters are lost to memory, are presented as if they built themselves or were the passive reflections of external forces. But what of the design work that gave them form, that was the result of training, experience, and the absorption of ideas materialized in other structures? Details of the Clermont choir reveal an individualistic master who translated the clergy's liturgical map into space and who fashioned a version of the Heavenly Jerusalem from colonnettes and capitals. We watch him think through a design that sought to reconcile the lucid articulation of plan, structure, and space with their insistent integration. Finely tuned piers and a meticulous arrangement of moldings became the effective means through which he realized an "architecture of perfection," an edifice in stone that designated the spiritual house of the Church "built upon the foundation of the apostles and prophets, with Christ Jesus himself as the cornerstone. Through him the *whole structure* is held together and grows into a temple … in him you also are being built together into a dwelling place of God in the Spirit."[39]

That the details of architecture had the power to excite admiration and visual delight reverberates in the Jean de Jandun's ekphrasis of Notre-Dame in Paris:

> Where can one find, I ask you, two towers of such magnificence, as perfect, as high, as wide, as strong, enriched with such variety, with such multiplicity of ornaments? Where does one encounter, I pray you, such a complicated grouping of lateral vaults both below and above? Where can one find, I repeat, the dazzling splendor of such a belt of chapels? This is not all: tell me, in what church will I see a cross of like size in which one arm separates the choir from the nave? Finally, I would very much like to hear where I would be able to see two similar roses facing one another, roses whose form gives the name to the fourth vowel. Below, small roses, rosettes, arranged with marvelous art, some in circles, others in lozenges, surround the sparkling windows which are embellished with precious colors and figures painted with the most exquisite delicacy.[40]

39 The quotation is taken from Ephesians 2:19–22 and cited as "central to the understanding of the church building in the Middle Ages" by Andrew Tallon, "An Architecture of Perfection," *Journal of the Society of Architectural Historians* 72 (2013), 536.

40 Excerpted from Jean de Jandun, *Tractatus de laudibus Parisius*, published in *Paris et ses historiens au 14e et 15e siècles*, ed. A.J.V. Le Roux de Lincy and L.M. Tisserand (Paris, 1867),

This is a picture of the cathedral that fits together 12th-, 13th-, and 14th-century parts that in themselves are not invested with historic associations or symbolic meaning. Nevertheless, they offer a spiritually inspiring experience as they cohere into the "imposing church of the most glorious Virgin Mary, mother of God, (that) justly shines at the summit as the sun amid the other stars."[41]

So can we push the engagement with concrete details a bit further to glimpse the architectural background of the Clermont design? Again, this is not an attempt to reconstitute the biography of Jean Deschamps: his memorial inscription mentions his wife, Marie, an unspecified number of unnamed children, and his role in beginning the church.[42] Moreover, Gothic architects could be quite versatile, customizing the tone and forms of a building to the requirements of the commission.[43] Rather my inquiry looks for the formative context of his architectural thinking displayed in the Clermont choir. As Nicola Coldstream cogently notes, "The origins of these men (i.e., Gothic architects) mattered far less than their training and the taste of their patrons, and the survival of their names is irrelevant to our understanding of their work."[44]

44–47. "Ubi enim queso reperient ipsi duas talis magnificientie turrres perfectas, sic excelsas, sic latas, sictortes, tali et tam multiplici decorum varietate circumamictas? Ubi queso reperient voltarum lateralium et secundum sub et supra ordinem tot membrorum? Ubi queso reperient tot circumstantium capellarum lucidissimas amenitates? Amplius dicant michi in qua ecclesiarum videbo tante magnitudinis crucem, ejus unum brachium chorum distinguit a navi. Demum libenter addiscerum ubi sunt tales duo circuli sibi invicem secundum rectam lineam opposite situatu quibus propter similitudinem nomen attribuunt quartre vocalis mia quoas minores orbes et orbiculi miro artificio, sic quidem encluariter sic autem angulariter ordinatim circumdant vitreos rutulantes pretiosis coloribus ac figuris picturarum subtilissimus venustatas."

41 Ibid., 44: "… illa terribilissima gloriossime Virginis Dei genetricis Marie ecclesia non numerito sicut sol inter astra prefulget."

42 "This memorial is that of Master Jean Deschamps, who began this church in the year of our Lord one thousand two hundred forty-eight, who lies with his wife, Marie, and their children in the tomb cut in front of the door of Notre-Dame de Grace," "Memoria sit quod magister Joannis Decampis incepit hanc ecclesiam anno Domini millesimo ducentesimo quadragesimo octavo qui jacet cum Marie uxore sua et liberis eorum in tumulo incise ante valvas Beatae Mariae gratiae." This lost epitaph was transcribed and published by Jean Dufraisse, *L'Origine des églises de France prouvée par la succession de ses évêques* (Paris, 1688), 505; and Élisabeth Guerry, "Les dalles tombales," *Clermont: l'âme de l'Auvergne*, 295.

43 To cite but one example, the early 14th-century master mason Pierre de Varinfroy's architectural *oeuvre* included the rayonnant extravaganza of the Meaux Cathedral north transept and the austere chapel of the Collège de Navarre in Paris that eschewed window tracery as well as stone vaulting. See Michael T. Davis, "A Gift from the Queen: The Architecture of the Collège de Navarre in Paris," *Medieval Women and Their Objects*, ed. J. Adams and N.M. Bradbury (Ann Arbor, 2016), 71–96.

44 Nicola Coldstream, "The Architect, History and Architectural History," *Transactions of the Royal Historic Society* 13 (2003): 219–26, quotation at 223.

Precedents for individual pier designs and, more broadly, the general strategy of their arrangement converge on Paris, specifically on three 12th-century buildings that were in various stages of expansion and renovation: Notre-Dame, Saint-Germain-des-Prés, and Saint-Denis. There is an uncanny resemblance between the choir plans of Saint-Germain-des-Prés, erected in the 1140s and 1150s, and Clermont, begun around 1248, that implies deliberate engagement rather than generic likeness arising out of a common functional program.[45] (Figures 15.2 and 15.15) As William Clark remarked, the builder of the abbey church "changed the geometric regularity in the hemicycle vaults to achieve visual unity in the choir space. This change is another example of the subordination of individual elements to the overriding totality of the scheme."[46] In both buildings, the western segment of the hemicycle creates an elision in the main vessel as it visually extends the straight bays into the space defined by the sanctuary vault. And in a similar way, the quadrangular aisle chapels invade the ambulatory, limiting the five radiating chapels to the turning bays. Perhaps, Jean Deschamps found in Saint-Germain a ready model that accommodated not only clerical performance and congregational assembly, but also efficiently integrated a maximum number of chapels that serviced the new demand for commemorative and private Masses for the dead.[47] If Jean had the opportunity to study Saint-Germain in person, he may also have recognized the sophisticated spatial system at work in the choir, drawing upon its premises when he was called to Auvergne to design and begin construction of Clermont Cathedral.

However, rather than reproducing the unity of Saint-Germain, Jean Deschamps used distinct pier forms to subdivide the space and, for this, Saint-Denis presents an intriguing precedent. The hemicycle's columnar piers with an attached shaft are tailored to the monocylindrical supports of Suger's ambulatory, whereas the compound piers to the west obey the logic of the rayonnant elevation, begun in 1231, creating the same sequence taken up at Clermont (Figures 15.8 and 15.16).[48] Once again, the Clermont design appears

45 Philippe Plagnieux, "L'abbatiale de Saint-Germain-des-Prés et les débuts de l'architecture gothique," *Bulletin monumental* 158 (2000): 6–88; Dany Sandron, Denis Hayot, and Philippe Plagnieux, *Paris gothique* (Paris, 2020), 179–89.

46 Clark, "Spatial Innovations," 365.

47 For the development of chantry chapels, Doquang, "The Lateral Chapels," 137–61; and "Status and the Soul: Commemoration and Intercession in the Rayonnant Chapels of Northern France in the Thirteenth and Fourteenth Centuries," *Memory and Commemoration in Medieval Culture*, ed. E. Brenner, M. Cohen, and M. Franklin-Brown (Farnham, Surrey, 2013), 93–118.

48 Branner, *Saint Louis*, 98; and Caroline Bruzelius, *The 13th-Century Church at St-Denis* (New Haven, 1985), 143–47 draws attention to the connections between Saint-Denis

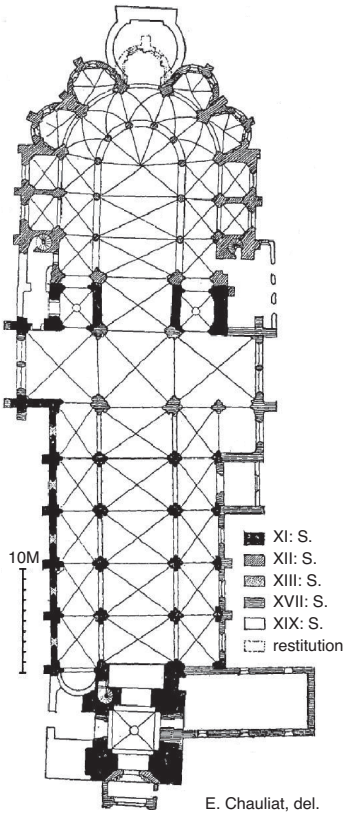

FIGURE 15.15
Paris, Saint-Germain-des-Prés: plan of abbey church
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to have been inspired by forms created in projects that remodeled older structures fitting new additions into existing fabrics. In the series of alterations effected at Notre-Dame, the installation of new tracery windows and the insertion of chantry chapels required the architect to harmonize new work with old, which, in turn, led to unusual pier compositions and clerestory windows set in a mural panel. Indeed, the tracery patterns, linkage, and the calligraphic sensibility of the eastern chapels (5–7) on the north side of the Notre-Dame nave are so close to the Clermont choir that Jean Deschamps can be imagined as a member of that Parisian workshop.[49] And might he have used Notre-Dame's

and Normandy in a shared treatment of a pier design whose cluster of shafts around a diamond-shaped core unifies the elevation.

49 The chapels 5–7 on the north side of the Notre-Dame nave are not securely attributed although Michel Bouttier, "La reconstruction de l'abbatiale de Saint-Denis au XIIIe siècle" *Bulletin monumental* 145 (1987), 357–86 proposed that they were built by Jean de Chelles.

FIGURE 15.16 Saint-Denis, Abbey Church, choir interior
PHOTO: STEPHEN MURRAY. IMAGE COURTESY OF THE MAPPING GOTHIC PROJECT, MEDIA CENTER FOR ART HISTORY. © THE TRUSTEES OF COLUMBIA UNIVERSITY

12th-century nave aisle piers, composed of a circular core surrounded by 12 *en délit* shafts that reflected the vault arches and ribs above, as a prototype for the cylindrical array of shafts of the Clermont ambulatory?

The Clermont ecclesiastical community, the bishop and chapter, may have set their architectural sights on Paris to express their status in a region still sparsely settled by the Gothic or to proclaim their ties to the throne that was

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Branner, *Saint Louis*, 98, singled out the gabled arches of the Clermont triforium that echo those of the Paris north transept as a sign of the "architect's first-hand knowledge of Notre-Dame and other Parisian buildings."

a source of aid and protection in the face of challenges from the regional aristocracy and local civic unrest. Notre-Dame, Saint-Denis, and Saint-Germain-des-Prés imbued the cathedral with a thoroughbred genetic inheritance, but it strains credulity to presume that the *formam et modum* the Clermont clergy had in mind was couched in pier forms or molding templates. We can only dream about the conversations between the project supervisors and their architect, but like the stories of the Troyes Cathedral bell tower or its later façade, they would have relied on their builder's ability to draw on his experience, his knowledge of other buildings, or his consultation with professional colleagues to emulate the "noble and magnificent" models of the capital.

Apart from its political clout or ecclesiastical stature, Paris, by the mid-13th century, enjoyed a reputation for excellence in the crafts.[50] The 1268 *Livre des métiers* spelled out regulations that governed apprenticeship, times and conditions of work, and the quality of materials. Aiming to end "fraudulent practices," the statutes established masters of good character ("*preud'omes*") to police the trades to ensure high standards, requiring that they examine firsthand the work produced to ensure an appropriate use of materials and the quality of its craftsmanship. A mason trained in the Parisian milieu could be expected to bring a sense of professional pride, vigilance, and skill to any building he undertook.

If, indeed, the Clermont choir's architectural genes can be traced to Paris, might we imagine Jean Deschamps as a member of the circle, possibly an apprentice, of the *doctor latomorum*, Pierre de Montreuil, who, between 1239 and his death in 1267, made a career at Saint-Germain-des-Prés, Saint-Denis, and Notre-Dame?[51] This is, of course, completely speculative, but it invites us to think about the context of training and experience that could shape a master mason's architectural personality. Assembling a background from the details of the Clermont choir design recovers a creative conversation that took place *with* time in which 13th-century builders' engagement with 12th-century structures played an important role in the generation of the rayonnant style. How such

50 Elizabeth Sears, "Craft Ethics and the Critical Eye in Medieval Paris," *Gesta* 45 (2006): 221–38. The skill of the city's artisans, ranging from painters and sculptors to armorers and bakers, and the high quality of their work is praised by Jean de Jandun, *Tractatus*, "De artificibus manualibus," in *Paris et ses historiens*, 52–55. For the regulations governing masons, Étienne Boileau, *Livre des métiers*, ed. R. de Lespinasse and F. Bonnardot (Paris, 1879), 88–92.

51 For Pierre de Montreuil, Louis Grodecki, "Pierre, Eudes, et Raoul de Montreuil à l'abbatiale de Saint-Denis," *Bulletin monumental* 122 (1964), 269–74; Branner, *Saint-Louis*, 43–46; Anne Prache, "Pierre de Montreuil," *Histoire et Archéologie, Dossiers* 47 (1980): 26–38; and Bruzelius, *Saint-Denis*, 173–74.

builders as Jean de Chelles, Pierre de Montrueil, or Jean Deschamps mined then rethought the rich vein of older forms reveals the individuality and creativity of their design thinking that is best revealed by close attention to the details.

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CHAPTER 16

From Half to Full *Palmier*: Factors Contributing to the Final Chevet Design of Toulouse's Jacobin Church

Richard Alfred Sundt

1 Introduction

The huge vault crowning the east-end of the Dominican Church at Toulouse—popularly known in France as the Jacobin—justly merits the encomium it has received over the past 375 years from ecclesiastics, architectural specialists, and casual observers alike (Figure 16.1).[1] Until the mid-20th century, scholars were divided on the dating of this magnificent canopy: some placing it in the late 13th century, others in the late 14th.[2] Archaeological excavations carried out by Maurice Prin (1928–2019) in the late 1940s and early 1950s have lent strong material support for the earlier dating,[3] thus confirming a statement made by the Dominican friar Bernard Gui (*c.*1261–1331) that the chevet was inaugurated in 1291 (1292 according to the Gregorian calendar), on the feast of the Purification of the Blessed Virgin Mary (2 February), with the celebration of "a first Mass" at an altar dedicated to Mary.[4] Except for the larger part of the walls

1 The earliest recorded reaction to the vault dates to 1647 and comes from the pen of Jean-Marie de Griffe de Rechac, *La Vie du glorieux patriarque S. Dominique … avec la fondation de tous les couvens … dans toutes les provinces du Royaume de France et dans les dix-sept du Pays-Bas* (Paris, 1647), 671. Rechac (1604–60), who was himself a Dominican friar, characterized the chevet as "une des merveilles de cett'Eglise ….".

2 For a general overview of this controversy and pertinent bibliography, see Richard A. Sundt, "The Jacobin Church of Toulouse and the Origin of Its Double-Nave Plan," *Art Bulletin* 71 (1989), 185, n. 2.

3 Maurice Prin, "La première église des Frères Prêcheurs de Toulouse, d'après les fouilles," *Annales du Midi* 67 (1955), 5–18. For a more recent perspective, see Wolfgang Schenkluhn, *Architektur der Bettelorden: Die Baukunst der Dominikaner und Franziskaner in Europa* (Darmstadt, 2000), 53.

4 Bernard Gui [Bernardus Guidonis], *De fundatione et prioribus conventuum provinciarum Tolosanae et provinciae ordinis praedicatorum*, ed. P.A. Amargier, O.P., Monumenta ordinis fratrum Praedicatorum historica 24 (Rome, 1961), 53, lines 3–8: "Ubi tempore prioratus [of Raymond Hunaud, 1285–94] fuit caput ecclesie consumpmatum cum columpnis de lapidibus molaribus tam decorum, et prima missa fuit ibidem in altari B. Marie Virginis solempniter celebrata per ven. virum abbatem Moysiacensem, d. Bertrandum de Monte Acuto, in

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FIGURE 16.1 Toulouse, Jacobin Church: view of the easternmost pier and the *palmier* or full-star vault in the chevet

and buttresses of the east, south, and north sides of the chevet (Figure 16.2, II, and IIIA, IIIB), which belong to two earlier building campaigns,[5] the rest of the present structure (IIIC), including its towered northern flank, was begun around 1280; then, during the second quarter of the 14th century, the

festo Purificationis B. Marie a. D. MCCXCI." According to Marie-Humbert Vicaire, "Le financement des Jacobins de Toulouse: Conditions spirituelles et sociales des constructions (1229–ca. 1340)," in *La naissance et l'essor du gothique méridional au XIII^e siècle*, Cahiers de Fanjeaux 9 (Toulouse, 1974), 242, the east-end was completed and dedicated in 1292 (based on the Gregorian calendar). The same date is also given by Maurice Prin, "L'église des Jacobins de Toulouse: Les étapes de la construction," in *La naissance et l'essor du gothique méridional au XIII^e siècle*, Cahiers de Fanjeaux 9 (Toulouse, 1974), 189–90.

5 Prin, "L'église des Jacobins," 194–204. The chevet belonging to the second campaign was probably aisleless and wooden-roofed. Around 1275 it was decided to heighten and vault the east-end in a third campaign (IIIA), but this work was only partially realized; just prior to launching the vaults, either the builders or the patrons decided to convert the chevet into a double-aisled structure. Prin's article is the fundamental source regarding these changes and evidence for them. The differences in the design of some of the north and south responds are mostly the result of reworking older fabric, rather than the initiation of totally new construction. For the recent and most comprehensive treatment of the church and convent, from beginnings to the modern era, see Maurice Prin, *L'ensemble conventuel des Jacobins de Toulouse: Son histoire, son architecture, son sauvetage et sa renaissance* (Toulouse, 2007), 70–100.

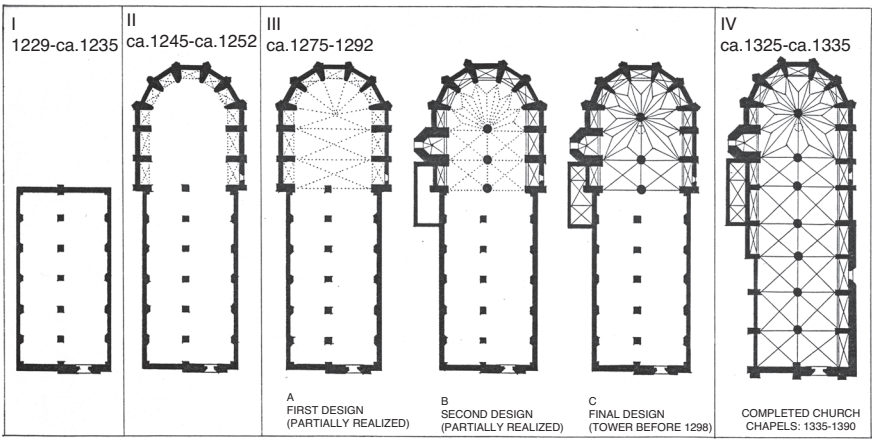

FIGURE 16.2 Toulouse, Jacobin Church: chronology of construction
DRAWING: F. LEFF, AFTER M. PRIN, "L'ÉGLISE DES JACOBINS"

five westernmost bay pairs were built in a fourth and final campaign (IV) to replace the original double-nave church the Dominicans had erected on this site between 1229 and 1235 (I).[6]

The late 13th-century east-end (Figure 16.2, IIIC) is divided into two vessels by three columnar piers, the first two of which support a pair of adjoining quadripartite rib vaults over squarish bays. From the final or easternmost pier springs a star vault that in one broad, circular sweep covers nearly two-thirds of the chevet's total area. This great vault, composed of 11 triangular sections and rising to a height of approximately 28 m, is aptly known in France as the *palmier* for here the vault ribs grow out of a central core, fan upward and then dip slightly downward, like the fronds of a palm tree. In the following pages of this essay, I will identify the architectural, historical, and liturgical factors that most likely contributed to or influenced this final vaulting solution for the church's east-end.

6 See Prin, "L'église des Jacobins," 191–207, for a detailed analysis and discussion of all four campaigns. For a summary, see Sundt, "The Jacobin Church," 186. As completed in the 14th century, the external length of the church measures 77.50 m and its width around 22.50 m. In 2002, Prin published another article on the church, but it is essentially a repetition of the one from the Cahiers de Fanjeaux series just cited. Its value lies in the dimensions he lists for the widths and heights of walls corresponding to the various building campaigns. See Maurice Prin, "Les Jacobins," in *Monuments en Toulousain et Comminges*, Congrès Archéologique de France, session 154 (1996), Société Française d'Archéologie (Paris, 2002), 175–86.

2 Sources of the Chevet's Design

When one considers both the monumental scale and masterful design of the Jacobin *palmier*, the absence of anything immediately similar to it in France both in terms of what survives and what is known to have existed prior to 1300, is surprising. This is not the case in England where one finds a number of vaults that are strikingly close to and earlier than the one at Toulouse. These occur in the country's centralized chapter houses, the majority of which are covered by a star vault configured by a collection of eight triradial segments emanating from a central vertical support (Figure 16.3).[7] Clarence Ward (1884–1973), writing in 1915, was one of the first scholars to draw attention to the similarities between the Dominican *palmier* and the English capitular vaults.[8] He then went so far as to stress this resemblance by illustrating, in his figure 89, a straight, upward view of the Jacobin ceiling.

A review of the sources that may have fostered making such a connection between the great Dominican vault and that of the English chapter houses is most directly traceable to the work of Eugène-Emmanuel Viollet-le-Duc (1814–1879) in his well-known multivolume *Dictionnaire raisonné*, published in Paris between 1854 and 1868. In volume 8 (on p. 95, image 12) Viollet-le-Duc illustrates a square structure that appears in Villard de Honnecourt's *Album* (or *Portfolio* as it is now known). The Villardian plan is shown here in Figure 16.5.

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7 For a brief overview of their origin and development, see Geoffrey Webb, *Architecture in Britain: The Middle Ages* (Harmondsworth, 1956), 61–63, 153–55; John Harvey, *The Cathedrals of England and Wales*, rev. and enl. ed. (London, 1974), 228–31, 239–48; and more recently Norbert Nussbaum and Sabine Lepsky, *Das gotische Gewölbe: Eine Geschichte seiner Form und Konstruktion* (Munich, 1999), 200–09, 224–25. Given the magnificence of the Jacobin's full stellar vault, it is surprising that its ceiling, and the edifice as a whole, exercised virtually no influence on later architecture. The only church that seems to have referenced Toulouse is one found at Fromentas, a small rural community in the southern French department of Gers. I was alerted to this monument by Maurice Prin, who also kindly provided me with a rough sketch of its ground plan. The church is dedicated to Saint Jacques and dates to the 15th century. I visited this edifice in December 2005 and found it in very poor condition; the interior was filled with scaffolding in order to support the vaults, except those of the apse, which were in reasonably good shape. Saint-Jacques is a double-nave church measuring internally, from east to west, to around 12.80 m. It consists of two nearly square bays per vessel, both of which terminate in a single, broad polygonal apse. This space is covered by a half-stellar vault rising from the building's easternmost pier; it is similar to Toulouse's campaign IIIB, but is composed of only three triradial rib vaults. On 7 May 2009, at the 44th session of the International Congress of Medieval Studies (held at Kalamazoo, MI), I presented a paper on this monument, titled, "Saint-Jacques de Fromentas: A Late Gothic Version in the Gers Countryside of Toulouse's Jacobin Church and Its *Palmier*."

8 Clarence Ward, *Mediaeval Church Vaulting* (Princeton, 1915), 182–83.

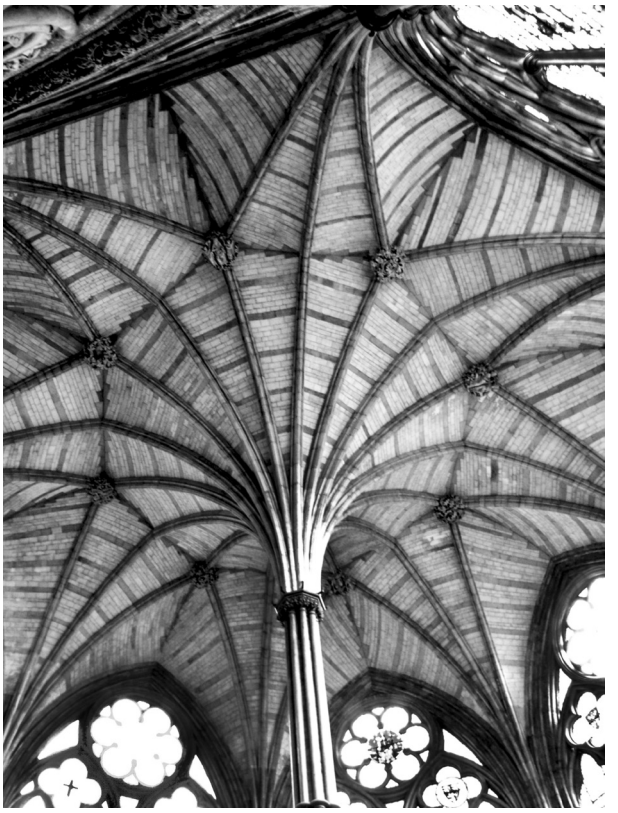

FIGURE 16.3 Westminster, Abbey: chapter house, view of the star vault

Regarding this image, Viollet-le-Duc wrote that "this plan clearly appears to be one of a chapter house" (donne un plan qui paraît bien être celui d'une salle capitulaire). But, upon close inspection of Viollet-le-Duc's own image 12, one notices that it is a slightly altered rendition of the drawing that occupies the upper left-hand corner of folio 21 recto (fol. 21r hereafter) in Villard's celebrated manuscript, Bibliothèque nationale de France, MS Fr 19093, and which is reproduced in color plate 44, in Carl F. Barnes, Jr. (1935–2012), *The Portfolio of Villard de Honnecourt* (*Paris, Bibliothèque nationale de France, MS Fr 19093*)*: A New Critical Edition and Color Facsimile*, AVISTA Studies in the History of Medieval Technology, Science, and Art (Burlington, VT, 2009).

Whether Villard sought to represent a chapter house in fol. 21r or something else remains a subject of debate. The question turns largely on whether the circle drawn at the center of the plan designates the location of a vault boss or the base of a centralized column used to support a star vault. Partisans of the

latter view tend to read the fol. 21r drawing as representing a chapter house with triradial rib vaulting, like the 13th-century centralized chapter houses in England, and by extension, the Dominican *palmier*. On this account, not only Ward, but also Karl Heinz Clasen (1883–1979) some 40 years later did not hesitate to claim that "the vault of the Jacobin Church at Toulouse surely goes back to English stimuli of this sort."[9] Several other scholars have also drawn attention to the architectural parallels between the English chapter houses and the Dominican chevet.[10] But, later in this article, in a further discussion of fol. 21r and the *Dictionnaire* image, it will become evident that more recent scholars and architects tend to doubt that Villard was intending to represent the base of a centralized column in the manner of English capitular halls.

First and foremost it should be noted that the employment of a full-star vault at Toulouse was itself a significantly logical solution to the problem of vaulting a double-aisled and polygonally terminated chevet; such a scheme cannot be automatically attributed to outside influence on visual evidence alone. An internal French source suggests itself by the fact that the main component of the *palmier*, the triradial ribbed vault over each of the triangular sections, was known and employed in France at an early date. At Le Mans (in the department of Sarthe), for example, triradial rib vaulting was used slightly before 1230 over the narrow wedge-shaped bays of the cathedral's outer ambulatory.[11] More significant and nearly contemporary with Le Mans was the employment of essentially the same vaulting system in the double-aisled chapter houses of the abbeys of Hambye (Figure 16.4) and Notre-Dame de Voeu, both in Normandy, and of Beauport in Brittany.[12] Since their east-ends were covered by a half-star vault, these capitular halls thus appear

9 Karl Heinz Clasen, *Deutsche Gewölbe der Spätgotik* (Berlin, 1961), 28: "Sicherlich geht das Gewölbe der Jakobinerkirche von Toulouse auf englische Anregungen dieser Art zurück."

10 Hans Sedlmayr, *Die Entstehung der Kathedrale* (Zurich, 1950), 420; James H. Acland, *Medieval Structure: The Gothic Vault* (Toronto, 1972), 114–15; Whitney S. Stoddard, *Art and Architecture in Medieval France* (New York, 1972), 306–07; and cf. Wolfgang Schenkluhn, *Ordines Studentes: Aspekte zur Kirchenarchitektur der Dominikaner und Franziskaner im 13. Jahrhundert* (Berlin, 1985), 74.

11 The cathedral's choir was begun *c.*1217 and work on the outer ambulatory was completed prior to the raising of the inner ambulatory elevation around 1230. See Jean Bony, *French Gothic Architecture of the 12th and 13th Centuries* (Berkeley, 1983), 259–60. For a discussion of triradial rib vaulting (*Rippendreistrahlgewölbe*) and its origins, see Clasen, *Deutsche Gewölbe,* 18–23 and Nussbaum and Lepsky, *Das gotische Gewölbe*: 22–23.

12 Bernard Beck, "Les salles capitulaires des abbayes de Normandie: Éléments originaux de l'architecture monastique médiévale," *Information d'histoire de l'art* 18 (1973): 207–08 and 210–13.

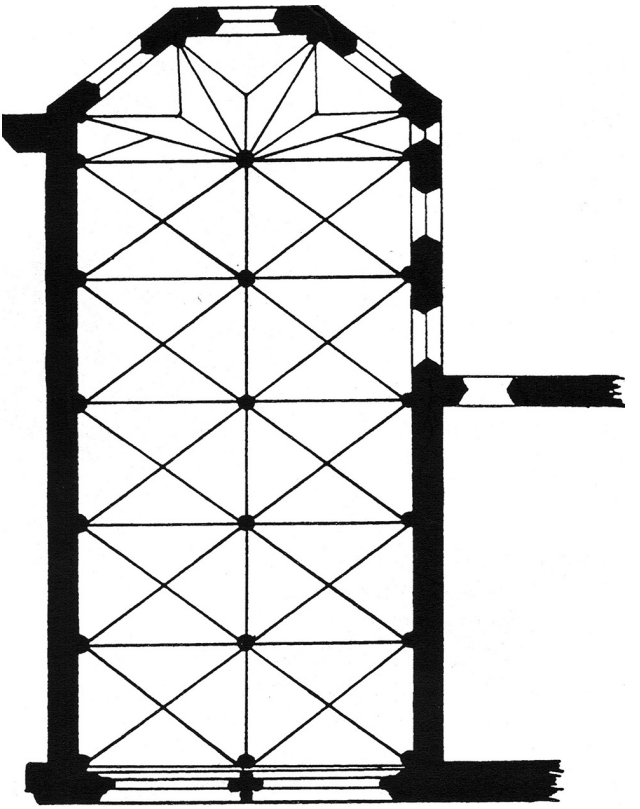

FIGURE 16.4 Hambye, Benedictine Abbey: plan of the chapter house
AUTHOR, AFTER B. BECK, "LES SALLES CAPITULAIRES"

to anticipate the full-star vault erected over the Dominican chevet some two generations later.

That knowledge of triradial rib vaulting extended to other parts of France besides Normandy, Brittany, and Maine seems at first glance to find confirmation as well in the work of Villard as seen in Bibliothèque nationale MS fol. 21r (cf. Barnes, *The Portfolio*, color plate 44).[13] Villard was in all likelihood from Picardy, in northern France, and his active career probably spanned most if not

13 Carl Barnes, Jr., who died in 2012, was a founding member of AVISTA and served as its president for two years (1990 and 1991). In addition to spending much of his career studying Villard, Barnes contributed important studies relating to the architecture of Soissons Cathedral and its relation to the beginnings of High Gothic in northern France.

all the second quarter of the 13th century.[14] In the upper left-hand corner of fol. 21r, Villard drew the plan of a square building (Figure 16.5). Commonly identified in the historical literature as a chapter house,[15] this structure is assumed to be covered by a series of triradial rib vaults like those of the Jacobin chevet, but without the bounding arches that divide the latter's ceiling into discrete triangular sections. If one accepts the interpretations or commentaries of prominent scholars such as Clasen, Hans Hahnloser (1899–1974), and others regarding the fol. 21r rendering, another significant similarity emerges: in both the Toulouse chevet and the Villard plan (as well as in many English chapter houses) the triradial ribs spring from a central vertical support.[16] But not

14 Prior to his monumental 2009 monograph, *The Portfolio*, Barnes produced in 1989 an exhaustive bibliography on Villard to accompany an exhibition titled *Villard de Honnecourt, Artist of the XIIIth Century: An Exhibition of Photographs and Commentary Based on Paris, Bibliothèque nationale, MS Fr 19093*. It was prepared by the Association Villard de Honnecourt, France, and shown, under the sponsorship of AVISTA, on 4–7 May 1989, at the 24th International Congress on Medieval Studies, Kalamazoo, Michigan.

15 Figure 16.5 is a drawing of a plan showing a square structure, which some scholars have referred to as a chapter house. Below the rendering there is a long rectangular compartment containing a brief description of what the rendering represents. The original text, as follows, is given by Barnes (*The Portfolio*, 146): "Pa[r] chu met om on capitel duit colon/ bes a one sole. sen nest mies si en con / bres. sest li machonerie bone." Barnes provides a literal English translation as follows: "By this [means] one puts a capital from eight columns into one alone, and it is not so encumbered. And the masonry is good." According to Barnes, the drawing itself is by Villard's own hand; however, he believes the inscription itself was written by another person, one whom Barnes designates as Hand IV (on Hands in the Portfolio see pp. 11–13). Presumably the content of the inscription is Villard's. M.F. Hearn credits *Villard* with the plan's accompanying caption and refers to the structure as a square chapel; see Hearn's "Villard de Honnecourt's Perception of Gothic Architecture," in *Medieval Architecture in Its Intellectual Context: Studies in Honour of Peter Kidson*, eds. Eric Fernie and Paul Crossley (London, 1990), 135 and fig. 38b.

16 Clasen, *Deutsche Gewölbe*, 22–23; and Hans Robert Hahnloser, *Villard de Honnecourt: Kritische Gesamtausgabe des Bauhüttenbuches ms. fr. 19093 der Pariser Nationalbibliothek*, 2nd rev. ed. (Graz, 1972), 122 (with a transcription of the inscription, and a German translation), are two important scholars of medieval architecture who maintain that the central circle in Villard's plan represents a column rather than a vault boss. Eugène-Emmanuel Viollet-le-Duc, in his *Dictionnaire raisonné de l'architecture française du XI^e^ au XVI^e^ siècle*, 10 vols. (Paris, 1854–68), 8:95, and in reference to his image 12, begins his observations with an interpretation that would later be expressed by Clasen and Hahnloser. Close inspection of the *Dictionnaire* image 12 reveals that Viollet-le-Duc altered Villard's rendering in fol. 21r by extending the length of the diagonal ribs so as to run directly into the corners. However, further along in his commentary, Viollet-le-Duc expresses doubt that the central circle represents a column, which may be right, but it may be as an accommodation to his alteration of Villard's original conception. For a useful review and summary of opinions regarding whether Villard's central circle represents a column or a vault boss, see Barnes, *The Portfolio*, 46–47.

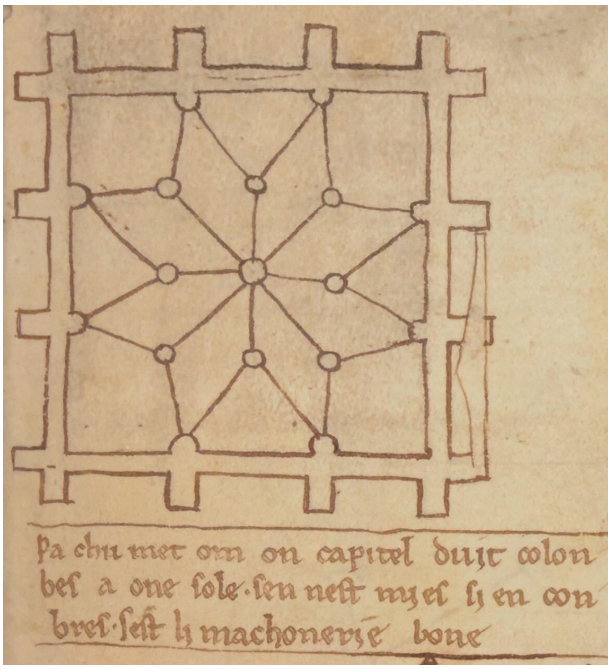

FIGURE 16.5 Portfolio of Villard de Honnecourt, fol. 21r detail: plan of a square, vaulted structure (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

all scholars agree that Villard had such a scheme in mind. In his 1993 publication on 13th-century technological thinking, Roland Bechmann (1883–2017) argued that the circle at the center of the plan does not represent a column, but rather the principal boss of a vaulted ceiling.[17] In essence, that is the same conclusion reached by another architect, Nigel Hiscock, as expressed in a communication which Carl Barnes quoted in his Portfolio monograph (p. 145). If Bechmann's hypothetical elevation of Villard's structure is correct,[18] one must admit that the similarities in plan between Toulouse and the Villard drawing do not translate into any significant likeness of elevation with respect to vaulting form, structure, or spatial composition. However, even if one cannot prove a direct relationship between Villard's structure and the Toulouse *palmier*, it is nevertheless clear that triradial rib vaulting was used in various parts of France

17 Roland Bechmann, *Villard de Honnecourt: La pensée technique au XIII^e siècle et sa communication*, rev. and enl. ed. (Paris, 1993), 118–21.

18 See ibid., 121, fig. 48, for Bechmann's conjectural rendering of the elevation.

during the early 13th century, and often in conjunction with double-nave structures. Thus, there is good reason to think that the great Dominican canopy may well owe its inspiration to French rather than English sources. But the situation, on the face of it, is not so simple and straightforward. This will be demonstrated later in connection with the voyage of two friars sent from Toulouse to England with the charge of quelling controversies among their fellow English Dominicans on issues internal to the Order.

3 Evidence for Design Changes

Although strictly circumstantial, there is some evidence pointing to a connection between the design of the Jacobin *palmier* and the star vaults of English chapter houses in Prin's convincing demonstration that Toulouse's present vaulting scheme is not the one originally planned for the chevet in 1280.[19] This can be readily deduced from the mid-20th-century excavations under the chevet's pavement that brought to light the foundations of a pier base situated 2.50 m directly west of the existing easternmost columnar support (Figure 16.6; cf. Figure 16.2, 111B and 111C). Such a find indicates that the final eastern pier was initially planned to stand, not in its present location, but further west, in direct alignment with buttresses 1N and 1S, in the same way the chevet's remaining buttresses and piers to the west would have aligned properly with one another (Figure 16.7). Had the original, more westerly disposition been retained for the easternmost support, it would have undoubtedly carried a half- rather than a full-star vault. This *demi-palmier* would have then been preceded by two pairs of squarish, rib-vaulted bays. A similar vaulting scheme had previously been used at Hambye (see Figure 16.4) and elsewhere in northwestern France and would be repeated in Germany a century later in the double-aisled crypt of Erfurt Cathedral.[20]

The conclusions drawn from archaeology are substantiated by analysis of the existing architectural fabric. As Prin noted, the form of the wall responds on the north and south sides of the chevet indicates not only an alteration in vault design during the construction process (Figure 16.8), but also the nature of the original vaulting scheme itself. These points are best illustrated by

19 Prin, "L'église des Jacobins," 197–204.

20 Clasen, *Deutsche Gewölbe*, 59, and fig. 41. Already during the Romanesque period, certain English cathedrals (e.g., Winchester and Worcester) had crypts of the same basic plan, either with two or four aisles, but with the easternmost pier supporting a groined, rather than a ribbed half-star vault. See Webb, *Architecture in Britain*, 30–31 and fig. 18.

FIGURE 16.6
In the background: view of the base of the full *palmier* (the easternmost pier). In the foreground: view of the octagonal foundation that had been prepared for the half *palmier* (or half-star vault)
PHOTO: M. PRIN, *L'ENSEMBLE CONVENTUEL*, 97

responds 2N (Figure 16.9) and 2S. It seems unlikely that this five-part respond was designed to support the seven ribs and arches of the present vaulting configuration. If contemporary and later churches in Toulouse are taken as a guide to local design practices, five-part responds were normally employed in conjunction with quadripartite vaults (Figure 16.10); this arrangement provided the transverse arch, rib, and formerets of adjoining vaults with corresponding members in each of the wall responds. It is reasonable to assume then that respond 2N was originally destined for a system of quadripartite vaulting (as in Figure 16.7) rather than the existing arrangement that combines the four-part vault of one of the nearly square bays with two neighboring triangular sections of the *palmier* (Figure 16.8). If this assumption is indeed correct, the chevet would have consisted of two pairs of broadly rectangular, quadripartite vaulted bays, followed by a seven-sided apse crowned with a half-star vault (Figure 16.7; cf. Figure 16.2, IIIB and IIIC). This design was a logical and, as the aforementioned Norman and Breton chapter houses show, a traditional solution to the problem of vaulting a double-aisled structure terminated by a polygonal

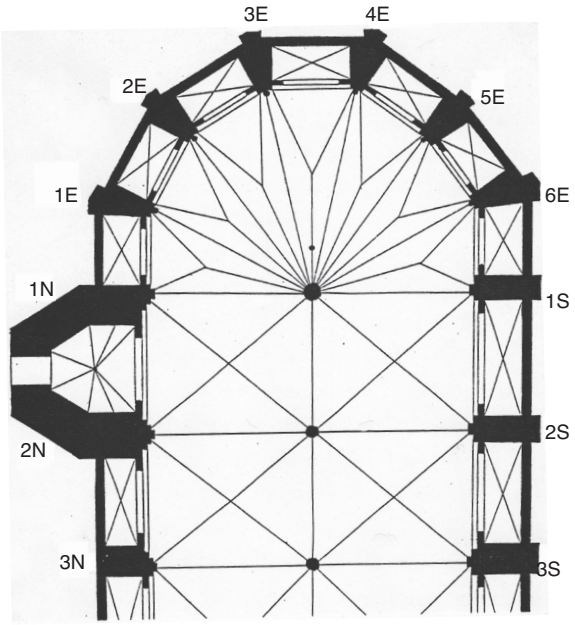

FIGURE 16.7 Toulouse, Jacobin Church: plan of the chevet, campaign IIIB, for the projected half-star vault

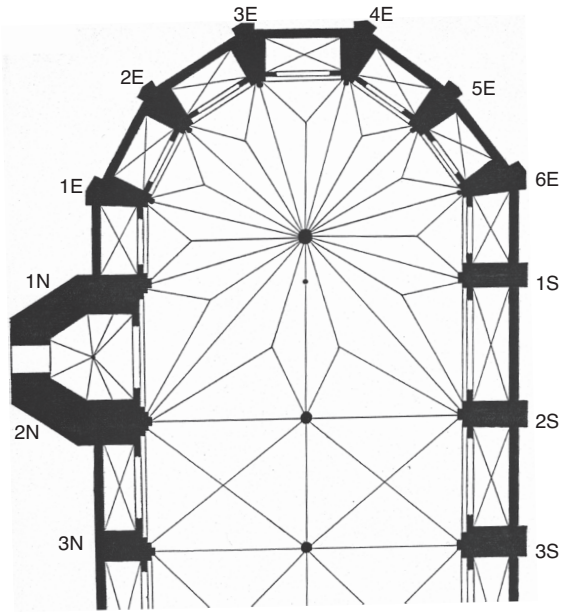

FIGURE 16.8 Toulouse, Jacobin Church: plan of the chevet, campaign IIIC, for the completed full-star vault

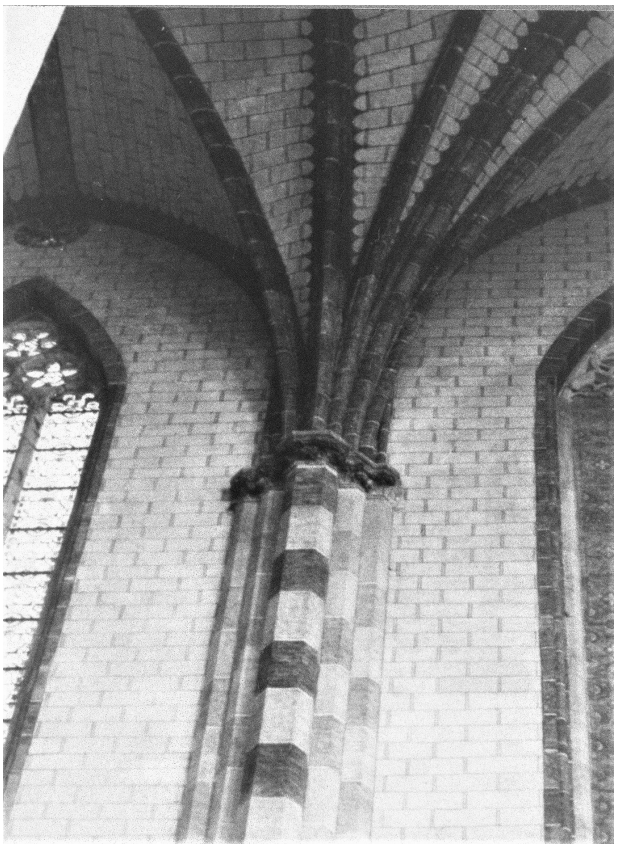

FIGURE 16.9 Toulouse, Jacobin Church: view of respond 2N, against the north chevet wall, campaign IIIc

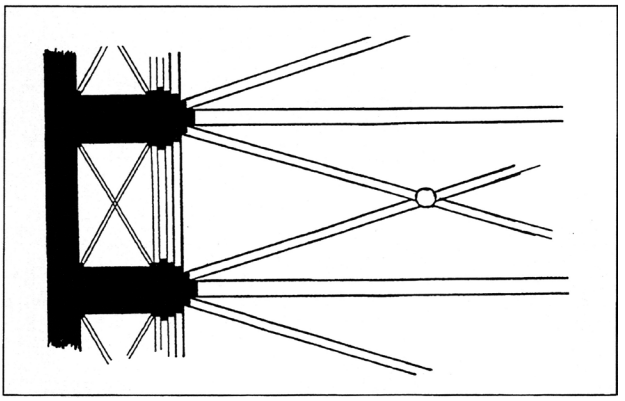

FIGURE 16.10 Toulouse, Franciscan Church: schematic plan of a lateral chapel and adjoining nave bay

apse. The builder's initial scheme at Toulouse in its double-nave manifestation was clearly determined by the position of the chevet's 12 buttresses. Since the master mason deliberately set the piers in line with the north and south buttresses (Figure 16.7), this established an inner and outer supporting framework admirably suited to the construction of a regular half-star vault over the apse.

If the original vaulting configuration for the double-nave church was mechanical or straightforward, the final or present design was unquestionably a magnificent and inventive response to the difficulties posed by a twin-vessel chevet (Figure 16.1). By liberating the last pier from its placement between buttresses 1N and 1S, and moving it 2.50 m eastward (Figure 16.8), the master builder was able to formulate a vaulting scheme whose generating principle was no longer the buttressing system, but rather the relocated pier itself (cf. Figures 16.7 and 16.8). The structural and aesthetic advantages of the new radial design are thus readily apparent. The full stellar vault ensured a more even distribution of vaulting thrusts around the easternmost pier than the asymmetrical first scheme; it also served to unify the space of the east-end by bringing almost two-thirds of its total area under the protection of a single vault, the *palmier*, and reducing the number of major spatial units from five to three.

There are no documents indicating at what stage in the chevet's construction the master mason decided to adopt the present vaulting arrangement. Had this been a last-minute decision as the evidence suggests,[21] it could not have been made much later than 1288 or 1289 since the *palmier* and its adjoining pair of quadripartite vaults were completed by February of 1292.[22] While it is easy to criticize the first vaulting scheme on structural and aesthetic grounds, these deficiencies alone may not in fact explain the adoption of a new design, a scheme so tenuous as to require the relocation of a pier and the use of responds built for a different vaulting configuration. What other factors then prompted a change of plan and elevation toward the end of the third campaign?

The master responsible for the discarded half-star vaulting system could conceivably have designed the present ceiling arrangement. As construction advanced, he may have come to realize entirely on his own some of the shortcomings of the initial project. On the other hand, the adoption of the present scheme in the late 1280s may well have been due to a change in the leadership

21 The architectural and archaeological evidence for this abrupt change is presented and discussed by Prin, "L'église des Jacobins," 197–200; see also Sundt, "The Jacobin Church," 204, and for some recent comments on the last part of the third campaign, see Schenkluhn, *Architektur*, 194–96, and nn. 532 and 533, in 262–63.

22 For the documentation, see n. 4 above.

of the *chantier*, although nothing of the sort is mentioned in the surviving primary sources.

However reasonable and plausible these suggestions may be, the possibility of English influence at Toulouse cannot be discounted, especially if the change in vaulting strategy came toward the end of the chevet's construction. Even so, English leadership in the design and erection of stellar vaults was probably not the immediate reason for the adoption of the *palmier* at Toulouse. The decision to employ a full stellar vault was more likely due to the presence at this convent of three well-respected friars: John Vigoroux (d. 1304), Bernard Géraud of Montauban (d. 1291), and Raymond of Mévouillion (d. 1294), all three of whom would have contact with England. The most influential of these were the first two; their long-term residency at the Toulouse convent coincided with the switch from half- to full-star vaulting.

4 The Case for English Inspiration in the Design of the Full *Palmier*

John Vigoroux's and Raymond of Mévouillion's purpose for travelling to England in the late 13th century was to quell opposition to certain teachings of Thomas Aquinas (*c*.1225–74) by a powerful and influential segment of English Dominicans. The Order's leadership viewed these attacks on Thomas's thinking with considerable alarm, especially since they were being spearheaded by no less a person than Robert Kilwardby (1215–79), the Dominican archbishop of Canterbury. On 18 March 1277, Kilwardby condemned 30 propositions in grammar, logic, and natural philosophy, 11 of which were either directly or indirectly concerned with Thomas's Aristotelian interpretation on the unicity of form and the passivity of matter.[23]

Worried by the increasing severity of the controversies, the Order wasted no time in defending Aquinas. At the general chapter held in Milan the following

23 Daniel A. Callus, *The Condemnation of St. Thomas at Oxford: A Paper Read to the Aquinas Society of London on 24th April, 1946*. Aquinas Papers 5, 2nd ed. (London, 1955), 3–35, esp. 11–31. For a broader perspective on this issue, consult William J. Courtenay, *Schools and Scholars in Fourteenth-Century England* (Princeton, 1987), 176–81, and James A. Weisheipl, *Friar Thomas d'Aquino: His Life, Thought, and Work* (New York, 1974), 331–50. Kilwardby's condemnation came on the heels of a much longer one issued 11 days earlier (7 March) by the bishop of Paris, Stephen Tempier (1210–79). Several of the 219 articles in the Paris condemnation were related to Thomas's teaching that substances were individuated by matter. See John F. Wippel, "The Condemnations of 1270 and 1277 at Paris," *Journal of Medieval and Renaissance Studies* 7 (1977), 169–71 and 185–94, and Roland Hissette, *Enquête sur les 219 articles condamnés à Paris le 7 mars 1277* (Leuven, 1977).

year, the assembled Dominicans agreed to dispatch two highly esteemed friars from the province of Provence, the aforementioned Raymond of Mévouillion and John Vigoroux, to investigate and discipline all brethren in England who had scandalized the Order by attacking Aquinas's writings.[24]

Although there is no surviving record of the places visited by the two friars, Oxford must surely have figured into their itinerary since a majority of the theological faculty at the University of Oxford seems to have accepted Kilwardby's injunctions and may have had a hand in formulating them.[25] Because the Oxford masters had been trained, like the archbishop himself, in the older Augustinian school of thought, they were opposed to the use of Aristotle's metaphysics and natural philosophy in theological analysis. Since this new way of thinking was alien to most friars of Kilwardby's generation,[26] it is reasonable to assume that the archbishop had adherents among his fellow Dominicans in other parts of England besides Oxford. Therefore, in order to discharge their mission faithfully, the two French friars would have been obliged to call upon a number of the country's other Dominican houses, and in the course of their visitations they could have seen one or several of the centralized chapter houses then existing in England. Of these, the most likely candidates would have been those located in towns where the Dominicans had convents by 1278, the year the visitation took place. This would then narrow the possibilities to three chapter houses: Westminster Abbey (*c.*1246–53), Beverley Minster (*c.*1230), and Lincoln Cathedral (*c.*1225–35). Unfortunately, the friars' itinerary is unknown; while they may not have reached Beverley or Lincoln, it is hard to imagine them bypassing London.[27]

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24 The declaration of the General Chapter of 1278, in *Acta capitulorum generalium ordinis Praedicatorum*, I, *Ab anno 1220 usque ad annum 1303*, ed. B.M. Reichert, Monumenta ordinis fratrum Praedicatorum historica 3 (Rome, 1898), 199, lines 1–11. This act reads in part: "Iniungimus districte fratri Raymundo de Medullione et fratri Iohanni Vigorosi … quod cum festinacione vadant in Angliam inquisituri diligenter super facto fratrum qui in scandalum ordinis destraxerunt de scriptis venerabilis patris fratris Thome de Aquino …." The visitation to England is discussed by Weisheipl, *Friar Thomas*, 341–42.

25 See Callus, *The Condemnation*, 13, and Courtenay, *Schools and Scholars*, 179–80.

26 Callus, *The Condemnation*, 8 and 15; see also William A. Hinnebusch, *The Early English Friars Preachers* (Rome, 1951), 344 and 346–56.

27 The Dominican convents of London, Beverley, and Lincoln were founded in 1221, *c.*1240, and before 1238 respectively, according to Roy Midmer, *English Mediaeval Monasteries (1066–1540)* (Athens, 1979), 208, 65, and 200. In the other English towns with early centralized capitular halls, the Dominicans either had no convents there, or only after 1278. The Salisbury Cathedral chapter house is not included in the list of possibilities since there is convincing archaeological evidence regarding the late date of its completion, perhaps around 1280 owing to a protracted building campaign that started around 1260. See Pamela Z. Blum, "The Sequence of the Building Campaigns at Salisbury," *Art Bulletin*

This city was not only the site of England's largest Dominican convent, but it was also on the way to Oxford. In London they could have prayed before the shrine of Edward the Confessor at Westminster, and admired the abbey's magnificent octagonal chapter house (Figure 16.3). To persons outside the local community of monks, Westminster was more accessible than other capitular halls, for in addition to its usual monastic functions, this edifice frequently served as the site for a variety of secular activities. Royal councils were held in this chamber beginning as early as 1257, and by the second half of the 14th century, it had become the regular place for convening the lower house of Parliament.[28] Adding to the likelihood of a Westminster visit by the French friars is the fact that the London Dominicans had frequent contacts and exchanges with the monks of the abbey, the first recorded instance occurring in 1250.[29]

After completing their English mission in late 1278 or early the next year, the two friars returned to southern France, but only John Vigoroux continued to be associated with the Dominican house at Toulouse.[30] Following a brief period as prior of Montpellier, John was appointed chief inquisitor at Toulouse in 1284, a post he held until 1289 when he was again called to the priorship of Montpellier.[31] John's stay at Toulouse thus occurred when construction of the east-end was nearing the vaulting stage. The question then arises: did his presence there at such a critical juncture in the chevet's construction contribute to the adoption of the full-star vaulting scheme? To this query a second must be added, but now involving another friar who also had close ties with the

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73 (1991), 22–23. The foundation of the Salisbury Dominicans goes back to 1245 when a friary was established at Wilton (5.63 km west of Salisbury). With the waning importance of Wilton, the friars decided in 1281 to transfer their convent to Salisbury. See Midmer, *English Mediaeval Monasteries*, 276 and 329.

28 The first documented parliamentary assemblies in the chapter house date from 1352. See: Ivy M. Cooper, "The Meeting-Places of Parliament in the Ancient Palace of Westminster," *Journal of the British Archaeological Association* 3 (1938), 114–18; Steven H. Wander, "The Restorations of the Westminster Abbey Chapter House," *RACAR: Canadian Art Review* 4 (1977), 78; and Paul Binski, *Westminster Abbey and the Plantagenets: Kingship and the Representation of Power, 1200–1400* (New Haven, 1995), 15 and 187.

29 See Matthew Paris, *Chronica majora*, vol. 5: *A.D. 1248 to A.D. 1259*, ed. Henry Richards Luard (London, 1880), 127.

30 Of the two friars, Raymond of Mévouillion probably did not play a significant role in designing the chevet on account of being elevated to the episcopacy in 1281 and then his death in 1294 as bishop of Embrun in the Dauphiné. See Jean-Jaques Percin (1633–1711), *Monumenta conventus tolosani ordinis F. F. praedicatorum primi ex vetustissimis manuscriptis originalibus transcripta: et S. S. ecclesiae patrum placitis illustrate* (Toulouse, 1693), Conventus tolosani, Saeculum primum, no. 7, 63; Jacques Quétif and Jacques Échard, *Scriptores ordinis Praedicatorum*, vol. 1 (Paris, 1719), 434b–36b.

31 Gui, *De fundatione*, 248, lines 25–27, and 249, lines 18–20.

Toulouse convent, Bernard Géraud of Montauban. There can be little doubt that he, too, had been in England in the late 13th century and was likewise in Toulouse when the chevet was under construction. As prior provincial of Provence from 1276 to 1282,[32] Bernard would have attended the Order's general chapter held at Oxford in 1280, the year when, according to a constitutionally mandated cycle, the chapter's membership was composed of prior provincials rather than *definitores*.[33] Although there were no centrally planned chapter houses in Oxford, Bernard might have seen the one at Westminster since, like the two previous friars, he, too, probably passed through London on his way to the Oxford meeting.

Four years later, in 1284, Bernard was elected prior of Toulouse, but he occupied this position for only a few months, since in 1285 he was again chosen to head the province of Provence.[34] In his brief biography on this friar, Bernard Gui describes him as the "factor operis" of the Dominican convent.[35] Some have taken this to mean that he was a friar-architect and thus largely responsible for the chevet's construction.[36] Within the context of Gui's treatise, this may be stretching the meaning of the term *factor operis* too far. Gui's statement can be more reasonably interpreted to mean that Bernard Géraud took a lively interest in the chevet's completion, and may have even had a hand in selecting the final vaulting scheme. Although his tenure as prior was limited to a single year, his position as provincial would have required him to maintain regular contact with a house as large, important, and centrally located as that of Toulouse. Thus, even after assuming the provincialate of the local province in 1285, Bernard would have been able to continue offering the Toulousain friars his advice regarding the design and erection of their church's eastern terminus.[37]

Bernard's and John's activities reveal that although responsibility for the design and construction of church edifices doubtless remained with the

32 Gui, *De fundatione,* 52, lines 24–37. At this time the Toulouse convent was still in the Dominican province of Provence. The division of this province into the province of Toulouse and the (second) province of Provence dates to 1303. See William A. Hinnebusch, *The History of the Dominican Order* (Staten Island, NY, 1966), 1:74.

33 See Georgina Galbraith, *The Constitution of the Dominican Order: 1216–1360* (Manchester, 1925), 25, 89, and 254. Definitors are a specially selected panel of friars.

34 Gui, *De fundatione*, 52, lines 24–27.

35 Gui, *De fundatione*, 52, line 29.

36 See, for example, Charles Higounet, "La chronologie de la construction: L'église des Jacobins de Toulouse," *Bulletin monumental* 107 (1949), 92.

37 His close tie with the Toulouse Dominicans is partially attested by the fact that upon his death, in 1291, Bernard was buried in the middle of their choir (presumably this meant in the northern vessel of the church of 1229–35, campaign 1 [see Figure 16.2]), Gui, *De fundatione*, 52, lines 35–38.

master masons, clerical involvement in matters architectural was perhaps more frequent and significant than often acknowledged. This engagement of ecclesiastics in areas normally regarded as the responsibility of secular masons was assured by the architectural legislation of the mendicant orders. The constitutions of both the Dominican and Franciscan friars set guidelines for the vaulting, size, and decoration of church and conventual buildings. Those of the Dominicans, in force *c.*1235 to 1241, went even so far as requiring each convent to appoint a building committee of three friars in order to monitor construction and enforce compliance with the architectural proscriptions.[38]

The timely presence of three friars who may have been personally acquainted with one or more of England's centrally planned chapter houses lends support to proponents of English influence at Toulouse. It is not inconceivable that upon learning the intention of covering the Jacobin's east-end with a half-star vault, either John Vigoroux or Bernard Géraud, or both, may have suggested to the master mason an alternative vaulting scheme based on their remembrance of English capitular halls.

5 Chevet as University Chapel

While an English pedigree for the Dominican star vault is a distinct possibility, independent invention of similar forms can never be completely ruled out, particularly when the principal element of a given form, in this case the *palmier*'s triradial rib vaulting, was known and practiced in various parts of France two generations before the erection of the Jacobin's magnificent ceiling. In trying to account for the present form of the Toulouse east-end, one last but

38 Charles M. Radding and William W. Clark, Medieval *Architecture, Medieval Learning: Builders and Masters in the Age of Romanesque and Gothic* (New Haven, 1992), 12, 67, 122, and 150, assign responsibility for design and construction to the master mason based on his cognitive skills, but see their statement on 35, first paragraph, for a qualification. A good case of clerical concern with the technicalities of construction has been documented by Stephen Murray, *Building Troyes Cathedral: The Late Gothic Campaigns* (Bloomington, 1987), 78 and 169, n. 6. According to fabric accounts preserved in the Aube departmental archives, the bishop and chapter of Troyes met on 13 July 1494, to consider questions concerning the construction sequence of a vault and flying buttress in the cathedral's nave. For the Franciscan constitutions, see Richard A. Sundt, "The Architectural Constitutions of the Franciscan Order: Thirteenth and Fourteenth Centuries," *Source: Notes in the History of Art* 38 (2019), 67–69; for the Dominican constitutions, consult Richard A. Sundt, "'Mediocres domos et humiles habeant fratres nostri': Dominican Legislation on Architecture and Architectural Decoration in the 13th Century," *Journal of the Society of Architectural Historians* 4 (1987): esp. appendices A and B, 405–06.

significant question remains to be addressed: did the chevet's function as a university chapel play a role in the decision to alter the design of the vaults and widen the spacing of the piers?

The first surviving ordinance assigning the chapel of the University of Toulouse to the Jacobin Church is found in the statutes of 1311.[39] These require that the daily requiem Mass for members and associates of the university be said in the church of the Dominicans: "in ecclesia fratrum Predicatorum Tholose … debeat et habeat celebrare." In the statutes of 1313 the same location, "in capite ecclesia," is specified for the celebration of Sunday Masses, which all members of the university were expected to attend.[40] Since these statutes were not all entirely new, but many were a regrouping and recodification of older ones,[41] there is good reason to think that the assignment of the university chapel to the Jacobin Church dates back to the 13th century,[42] perhaps coinciding with the enlargement of the original church between 1245 and 1252 (Figure 16.2, II).[43] In any case, it is certain that by the late 13th century, if not earlier, the university was already celebrating its Masses in the Dominican

39 Marcel Fournier, ed., *Les statuts et privilèges des universités françaises: Depuis leur fondation jusqu'en 1789*, 4 vols. (Paris, 1890–94) (Rpt. ed. Aalen: Scientia Verlag, 1970), I, no. 543 (Toulouse, on administration; issued 12 March 1311), 467, col. A and Cap. XIII, 471, col. A. For a general history of the university, founded in 1229, see Cyril Smith, *The University of Toulouse in the Middle Ages: Its Origins and Growth to 1500 A.D.* (Milwaukee, 1958), esp. 82–91, dealing with the monastic orders and the university, and Yves Dossat, "L'université de Toulouse, Raymond VII, les capitouls et le roi," in *Les universités du Languedoc au XIII^e siècle*, Cahiers de Fanjeaux 5 (Toulouse, 1970), 58–91.

40 Fournier, *Les statuts*, I, no. 544 (Toulouse, new statutes issued A.D. 1313), [3].1., 474, col. B: "Quia, secundum consilium legislatoris … exstitit in primis ordinatum, quod de cetero quolibet die dominico, statim post sermonem in capite ecclesie fratrum Predicatorum missa per Universitatem memorati studii de Beata Virgine celebretur, necnon in Purificatione et Assumptione missa sollempnis."

41 See Smith, *The University of Toulouse*, 80.

42 On this point, see Dossat, "L'université," 69, and his clarification and correction of the pertinent documentation.

43 William Pelhisson, "De emptione et adquisitione secundi loci Fratrum Predicatorum Tholose" in Bernard Gui, *De fundatione et prioribus conventuum provinciarum Tolosanae et provinciae ordinis praedicatorum*, ed. P.A. Amargier, Monumenta ordinis fratrum Praedicatorum historica 24 (Rome, 1961), 34, lines 3–14. Friar Pelhisson (*c.*1205–68), writing in 1263, mentions five altars on the south side of the church (corresponding to the straight and polygonal parts of the chevet of campaign II). He notes that the southern side was reserved for the laity, but makes no mention of a university chapel in the south half of the chevet or elsewhere within it. It is not clear if the eastern half of the edifice corresponding to campaign II was ever roofed, partially or completely. For a discussion of the way the two original vessels were employed in the Dominican church and the origin of its double-nave plan, see Sundt, "The Jacobin Church," 187, n. 7, and 197–205.

Church. This is mentioned in passing in a document of 1297 dealing with the succession of Pons Mas (fl. 1297–1310) as university beadle.[44]

In most of the statutes and documents relating to the University of Toulouse, the location of the chapel is simply given as "in ecclesie Predicatorum," but one of the statutes of 1313 situates it very precisely "in capite ecclesie,"[45] that is, in the chevet of the Dominican Church. This statute, like numerous others, also states that university Masses should be celebrated in honor of the Virgin Mary. It is quite possible that the altar assigned to the university for its daily and Sunday worship is identical with the altar of the Virgin Mary used in the inauguration ceremonies of the east-end in 1292.[46] The exact location of this altar within the chevet is not disclosed in any of the medieval documents, but its position next to one of the great columns cannot be doubted.[47] Chapter 30 of the statutes of 1314 declares that lest anyone plead ignorance of the new regulations, these were to be made known by having them "written in a book or booklet chained or nailed on the stone column where the Sunday Mass ordered above is sung."[48] The column specified in this document must be the easternmost support. The altar stood slightly west of it, and thus under the grandest and most expansive portion of the towering *palmier*. From two other chapters of the 1314 statutes, one learns that the area in front of the altar was furnished with seating stalls, presumably arranged in collegiate style, namely,

44 H. Gilles, "Documents inédits pour servir à l'histoire de l'université de Toulouse au XIII[e] siècle," in *Les universités du Languedoc au XIII[e] siècle*, Cahiers de Fanjeaux 5 (Toulouse, 1970), 296, and document no. 3, dated 29 December 1297, 301, lines 1–9.

45 See n. 40 above.

46 See n. 4 above for the documentation. That the university and Virgin's altar are one and the same finds support in a document dated 20 August 1461, which describes the university gathered in the chevet as seated "ante altare Virginis Marie." See Fournier, *Les statuts*, III, no. 1916 (Toulouse, proclamation dated 20 August 1461), 637, col. A.

47 The Virgin's altar in the chevet should not be confused with the axial projecting chapel added later, which in the 15th century carried the dedication Notre-Dame de Graces (in the early 17th century it was changed to Notre-Dame du Rosaire). On the dedications of the axial projecting chapel, see, Anonymous, *L'église des Jacobins de Toulouse: La restauration des Jacobins* (Toulouse, 1974), 20–21. Pelhisson's (see n. 43 above) mention of five altars on the south side of the chevet (campaign II), includes one dedicated to the Virgin Mary, but it did not occupy the axial position. A reading of the pertinent passage indicates that the Virgin's chapel was the second one south of the axial chapel (i.e., between buttresses 5E and 6E in Figure 16.8). For assistance in locating the five chapels through the land purchases inventoried by Pelhisson, see Vicaire, "Le financement," 209–53, esp. 246, no. 13 and fig. 13 (plan II).

48 Fournier, *Les statuts*, I, no. 545 (Toulouse statutes, issued 15–23 July 1314), Cap. XXX, 490, col. B: "scriptis in aliquo libro vel quaterno incathenato vel clavellato in columna lapidea, ubi cantatur in die dominica missa superius ordinata ….".

in one or more tiers set facing each other.[49] Another chapter of these statutes establishes the seating order for the various members of the university, including the *cathedra* reserved for the rector "in medio doctorum et magistrorum."[50] If the liturgical and spatial arrangements of the university chapel as described in early modern sources are identical or similar to the ones ordained in 1314, the rector's *cathedra* would have stood by the second column (from the east) and facing the Virgin's altar placed near the base of the *palmier*.[51] In the 15th century, a pulpit, presumably for preaching university sermons, was erected on the north side of the chevet, against the eastern buttress wall of the tower chapel (respond 1N in Figure 16.8). Accompanying the erection of this and a later pulpit within the chevet was the increasing number of tombs raised by the city's and region's elite.[52] With respect to the tombs of the university masters, these were concentrated in areas near the second pier and occupying chiefly the left-hand portion of the great apse (see n. 51 above). Thus, in every sense of the word, the Jacobin chevet served as a university chapel, even if set within a church dedicated to the worship and preaching ministry of the Dominican friars. Since the Dominican Order had played a key role in the establishment of the University of Toulouse and its early curriculum, the assignment of the chapel to the Jacobin Church is entirely understandable.[53]

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49 Fournier, *Les statuts*, I, no. 545 (Toulouse statutes, issued 15–23 July 1314), Cap. VI, 483, col. B.

50 Fournier, *Les statuts*, I, no. 545 (Toulouse statutes, issued 15–23 July 1314), Cap. XXIX, 489, col. B and 490, col. A.

51 See Marie-Humbert Vicaire, "Les 'Jacobins' dans la vie de Toulouse aux XIII^{e} et XIV^{e} siècles," *Archivum Fratrum Praedicatorum* 57 (1987), 21 and n. 92, regarding liturgical and functional arrangements in the Toulouse convent, and on the location of the masters' tombs next to the second pier of the chevet, and on the "gauche" (i.e., north) side of the great apse. Cf. Percin in n. 52 below.

52 Augustin Manavit, "Notice historique sur l'église des Dominicains de Toulouse, précédée de quelques faits sur saint Thomas d'Aquin," *Mémoires de la Société impériale archéologique du Midi de la France* 7 (1853–60), 159, and accompanying an unnumbered plate of the ground plan showing pulpit location at no. 2S. According to Elie Lambert, "L'église et le couvent des Jacobins de Toulouse et l'architecture dominicaine en France," *Bulletin monumental* 104 (1946), 164–65, the first pulpit in this location was constructed in 1496; it was replaced by a Baroque one in 1689. In due course, all of the church was eventually covered by tombs belonging to lay individuals, many supporters of the convent. On burials in the most prestigious locations, next to the first and second piers, consult Percin, *Monumenta conventus*, Opusculum coemeterium nostrum: Pars secunda,Tumuli in choro, 264–66; Pars tertia, Majus pilari, 267–68 and A pilari majori ad minus claustrum, 268–69.

53 On the Order's role in the foundation of the University and the services which the Toulouse Dominicans rendered to the academy, see Dossat, "L'université de Toulouse," 69, and Marie-Humbert Vicaire, "Roland de Crémone, ou la position de la théologie à l'université de Toulouse," in *Les universités du Languedoc au XIII^{e} siècle*, Cahiers de Fanjeaux 5

If the Jacobin chevet planned in the late 13th century was intended to function primarily as a university chapel, this factor could explain why the half-star vault (IIIB) was ultimately abandoned in favor of the full stellar vault now in place (IIIC). In the initial plan (Figure 16.7), the half *palmier* would not have focused as much of the viewer's attention on the chevet's center as a reading of the plan itself suggests (even the present vaulting arrangement presents some limitations in this regard, a point discussed below). The half-star vault would have functioned rather as a bridge linking the north and south vessels at the east-end, as well as a grand ambulatory giving access to the radiating chapels lodged between the apsidal buttresses. If the space under the projected half *palmier* is, at about 12.50 m, overly spacious for these functions, the central arcades corresponding to the rectangular bays of this first vaulting scheme are, at about 8 m, somewhat on the narrow side, and thus poorly suited for accommodating comfortably an altar and seating between the piers.

6 Spatial and Structural Advantages of the Full-Star Design

On the other hand, the full-star vault (Figure 16.8) provides a very satisfying arrangement for a university chapel since the repositioning of the easternmost pier some 2.50 m further east had two beneficial results with respect to usage. First, it reduced the width of the ambulatory without either impeding circulation around the apse or limiting access to the radiating chapels, and second, it widened considerably, to nearly 10 m, the distance between the eastern pier and the next one to the west (cf. Figures 16.7 and 16.8).[54] In functional terms, this opening up of the chevet's center provided a more spacious and commodious location for the Virgin's altar and the stalls of the university community (Figure 16.11). And, from an aesthetic point of view, the centrally planned design gave the chevet greater prominence within the church by drawing the viewer's gaze away from the central file of supports and directing it instead toward the great vaulted canopy under which the university celebrated its religious services.

It should be pointed out, however, that the centralizing character of the full *palmier* design is not as readily apparent as Wolfgang Götz and others imply in

(Toulouse, 1970), 175. For example, the Dominican convent possessed the bell to ring the hours of university classes and was charged with providing secure storage for all important university documents, according to stipulations in the 1313 statutes. See *Les statuts*, I, no. 544 (Toulouse, new statues issued A.D. 1313), [43] XV and [43 *bis*], 478, col. A.

54 Dimensions are taken from measured plans in Maurice Prin's publications.

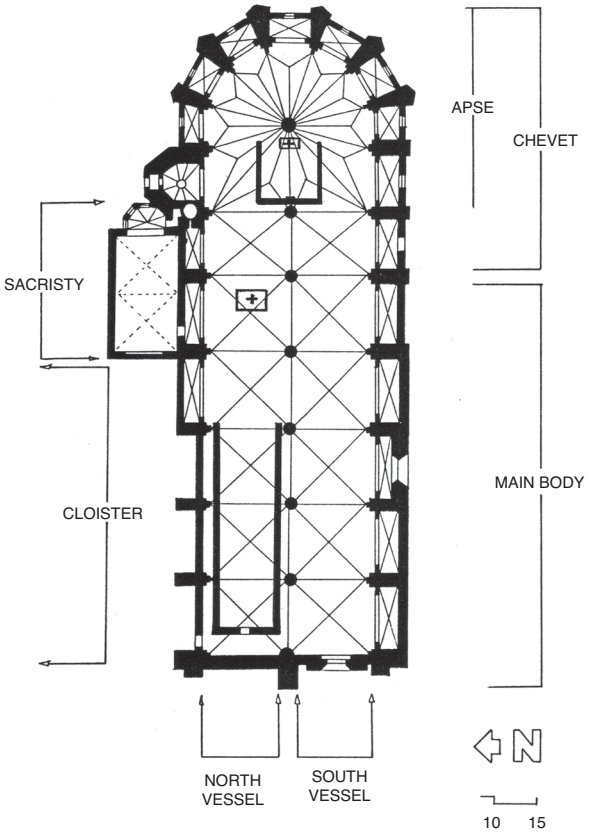

FIGURE 16.11 Toulouse, Jacobin Church: Liturgical arrangement of altars and seating in Toulouse IV
DRAWING: F. LEFF AND AUTHOR

their spatial analysis of the church.[55] A *Zentralbautendenz* is certainly evident at Toulouse when one looks at a ground plan of the east-end, but when one physically enters the building from the western portal of the southern vessel, the great *palmier* remains largely hidden from view by the piers and the vaults of the two naves (Figure 16.12), in spite of the wider arcading between the easternmost pier and the next one to the west.[56] It is only when one reaches the

55 Wolfgang Götz, *Zentralbau und Zentralbautendenz in der gotischen Architektur* (Berlin, 1968), 115.

56 Too often architectural historians make judgments about space and aesthetics based on what they see in plan rather than upon direct observation and experience of the built structure (or even indirect observation by means of photographs). Both the plan and the

FIGURE 16.12 Toulouse, Jacobin Church: view eastward of the two naves as seen from the southwestern part of the church

straight bays of the chevet and gazes not so much around, but up to the ceiling, that the great stellar vault comes into view. Whether willed by the designer or not, this gradual revelation of the architecture serves to heighten both the solemnity and grandeur of the *palmier* and its surrounding space.

Another feature of the Jacobin chevet that should not be overlooked is how the full *palmier* design anticipates a treatment of space in Late Gothic architecture that will eventually gain particular favor in the German world. As Robert Bork has recently observed with respect to the early 15th-century Franciscan

actual experiencing of a building should be taken into consideration when analysing space and aesthetic effects.

church at Salzburg—to use it as one of the most classic examples of the type—the axial column of its choir and the next two western supports "are no longer aligned with the bay divisions on the exterior wall," but rather are "decoupled from each other."[57] Similarly in the Jacobin, the *palmier* and the next columnar pier to the west are "decoupled" from their corresponding buttress walls (1N, 2N, and 6E, 1S in Figure 16.8). Thus, the Toulousain chevet marks an early step in freeing interior space and form from the surrounding buttressing mass. In this sense, the Jacobin church stands at the cusp of one of the "hallmarks of Late Gothic design" as Bork has made so clear.

From the foregoing analysis of the Jacobin east-end and the historical circumstances attending its conception and construction, it is evident that the possible sources for the *palmier*'s design were both numerous and complex. Unfortunately, it is difficult to say precisely which factor or combination of factors were responsible for bringing about the change from a half- to a full-star vault. Despite the well-documented connections between England and the Dominican house at Toulouse in the late 13th century, English influence on the design of the church's chevet cannot be proven, and since triradial rib vaulting was known and used in France as early as the first third of the 13th century, it is unnecessary to attribute either the half- or full-star scheme of the Jacobin chevet to English stimuli.

On balance, the creation of the full *palmier* at Toulouse appears to be an imaginative, internal response to local architectural and functional concerns. With respect to the first, the adoption of the full-star vault permitted a more uniform distribution of arches, ribs, and thrusts around the easternmost support. And with respect to the second, the wider spacing of the piers under the *palmier*, which this vaulting system required, provided a more open location for the university chapel. But whatever the source or sources of the full *palmier*, and whatever reasons may have prompted its adoption in the late 13th century, it is hard to conceive of a more appropriate and glorious ceiling for a monument that was developed gradually, starting from an unpretentious structure composed of two vessels of unequal width and covered by a timber roof, to a magnificent edifice crowned at the eastern terminus by a masonry, palm-like vault. The Jacobin church that stands today at the center of old Toulouse is surely one of the grandest and most memorable examples of ecclesiastical architecture conceived and realized in France during the Gothic period.

57 Robert Bork, *Late Gothic Architecture: Its Evolution, Extinction, and Reception*, Architectura Medii Aevi 10 (Turnhout, 2018), 132. On Salzburg and related churches, see Norbert Nussbaum, *German Gothic Church Architecture*, trans. Scott Kleager (New Haven, 2008), 169–71 and esp. figs. 178–79.

Acknowledgment

I am very grateful to my wife, Christine Leszczynski Sundt, for her patient and expert assistance in reformatting the original AVISTA article for this publication, and also for ensuring the accuracy of the various emendations to the text and notes.

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CHAPTER 17

Holy Toledo Redux: Reconsidering Art-Historical Taxonomy and the Morphology of Toledo Cathedral

Robert Bork

1 Reflection

Evolution was a central theme in the original version of this essay, published in 1997, and evolution also serves as an appropriate framework for the reconsideration of its argument after more than two decades, in several complementary senses. On a personal level, this was my first article as a medievalist, in which I began to develop an approach to cultural history that continues to inform my work today. So, although Toledo Cathedral has occupied only a marginal place in my ongoing research, I find it interesting to look back and ponder how my career has evolved from this early project. On a broader historiographical level, the field of medieval architectural history has also evolved in the intervening decades, in ways that have enriched my perspective on this material, and on my approach to it. In the following pages, therefore, I reflect briefly on these developments, before going on to present a revised and updated version of my essay, in the hope that this contextualization and refinement will add value to the re-presentation of its core arguments.

My enduring fascination with questions of evolution and taxonomy has deep roots, since my paleontologist father introduced me to these concepts early in my childhood, when I was first learning about dinosaurs, Darwin, and the fossil record. In high school, after a family sabbatical in France had sparked my interest in Gothic architecture, I began to notice that some of the questions in art history recalled those in paleontology, in terms of trying to understand patterns of development and change over time. I also noticed, though, that writers on art tended to use the term 'evolution' in a very different way than I had seen in paleontology, often implying connotations of progressive linear development that had no part in Darwin's intellectual model. I thus began to suspect that the possible relevance of Darwinian models for the discussion of cultural history had been underestimated, and that this might reflect the communication gap between the 'two cultures' of science and the humanities that

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had been decried in the 1950s by C.P. Snow.[1] My own attempt to bridge that gap mostly involved taking classes in architectural history while majoring in physics, first as an undergraduate at Harvard, and then as a graduate student at the University of California at Santa Cruz.

The seed for this essay on Toledo Cathedral was planted during my time at UCSC, when I was serving as a teaching assistant for a course on Gothic architecture taught by Virginia Jansen. Working under her supervision helped me to broaden my perspective on the field, both because of her own expertise, and because her 1991 course introduced me to Christopher Wilson's excellent book *The Gothic Cathedral*, then newly published.[2] I vividly recall reading his comparison between the aisle windows of Toledo and Beauvais, which caused me to see both buildings in a new way, since I immediately realized that the two shared not only their window format, but also their overall spatial organization. It really was a 'Holy Toledo!' moment, in which I felt that I was seeing something that had not been commented upon before. Perhaps for that reason, this event felt even more empowering than the longer projects I had undertaken in my own previous art history coursework, where I had begun to grapple with broad topics such as the early history of Gothic structure in France, and the development of Gothic spires in Germany. Taken together, though, these experiences began to convince me that I could make more original contributions to the study of Gothic architecture than I could to the study of physics. In the summer of 1991, therefore, I left UCSC to begin researching Gothic under the joint supervision of Princeton's Robert Mark and Columbia's Stephen Murray.

In the time since then, I have aimed to bridge the gap between the two cultures by reaching out to the sciences from within the humanities, something that I aimed to do in a small way by using my observation about Toledo and Beauvais as the anchor of a short article on the taxonomy of Gothic architecture. I continue to believe that a basically Darwinian model provides a good framework for the discussion of artistic production and exchange, one in which categories such as 'Gothic architecture' or 'the school of Bourges' are recognized as useful abstractions, rather than being dismissed as useless, on the one hand, or fetishized as entities with 'true' essences, on the other. When I began to write up my thoughts on Toledo and Beauvais early in graduate school, these thoughts were uppermost in my mind, and I found myself

1 Charles Percy Snow, *The Two Cultures* (Oxford, 1959).

2 Christopher Wilson, *The Gothic Cathedral: The Architecture of the Great Church 1130–1530* (London, 1990).

engaging principally with the work of Jean Bony, Robert Branner, Christopher Wilson, and my mentor Stephen Murray.[3]

In the immediately following years, as I was beginning to plan my dissertation on Gothic spires, I also came to recognize two other advantages of the Darwinian metaphor. First, it allowed me to treat the 'great spire,' much as Wilson had defined the 'great church,' demarcating a coherent sphere of inquiry without denying that these prestigious 'species' shared some developmental history with other humbler monument types. Second, I began to realize that the Darwinian metaphor provided a nonteleological way to discuss change over time, one that could help to explain not just the technical progress seen in the earlier phases of Gothic architecture, but also the displacement of the Gothic tradition in the Renaissance. By emphasizing competition and exchange between populations of artistic ideas and cultural memes, this framing gets beyond the determinism inherent in metaphors that compare the development of artistic traditions to the growth and aging of the individual body, or the autumn leaf. This was particularly important to me because many of the monuments I love date from the late Gothic era, which has often been derided as an era of decadence and decline, an attitude encapsulated in Johan Huizinga's widely influential book *The Autumn of the Middle Ages*.[4] By using a broadly Darwinian approach in my dissertation, I was able to escape the undertow of this judgmental and misleadingly deterministic metaphor of cultural senescence.[5]

Over the past quarter-century, I have returned repeatedly to the theme of cultural evolution that I began to explore in my dissertation, and in my article on Toledo, which was published in the *AVISTA Forum Journal* in 1997.[6] Most notably, I developed a pair of articles and a CAA talk specifically about this

3 Specifically, I was engaging not only with Wilson's *Gothic Cathedral*, but also with Jean Bony's *French Gothic Architecture of the Twelfth and Thirteenth Centuries* (Berkeley, 1983), with Robert Branner's *The Cathedral of Bourges and Its Place in Gothic Architecture* (1962, repr. Cambridge, MA, 1989), and with Stephen Murray's *Beauvais Cathedral: Architecture of Transcendence* (Princeton, 1991).

4 Johan Huizinga, *The Autumn of the Middle Ages* (1919, repr. Chicago, 1996), originally published as *Herfsttij der Middeleeuwen*, and widely known to Anglophone readers by its first English title, *The Waning of the Middle Ages*.

5 Robert Bork, *Skyscrapers of the New Jerusalem: Meaning and Development of the Gothic 'Great Spire'* (PhD Dissertation, Princeton University, 1996); a heavily revised version later appeared as *Great Spires: Skyscrapers of the New Jerusalem* (Cologne, 2003).

6 Robert Bork, "Holy Toledo: Art-Historical Taxonomy and the Morphology of Toledo Cathedral," *AVISTA Forum* 10, no. 2/11, no. 1 (1997/98): 31–37. I am tremendously grateful to Michael Davis, who was then editor of the journal, for helping me to get this essay into print as I was first trying to establish myself in the field.

theme, and I used an explicitly Darwinian frame in my recent book *Late Gothic Architecture: Its Evolution, Extinction, and Reception*.[7] As I more or less expected at the beginning of my professional journey, reactions to this approach have been mixed. I have been gratified to observe, though, that most of the critiques I have encountered have been based on the widespread misconception that evolution must be linear, progressive, and teleological. When I succeed in explaining the actual structure of my model, these objections tend to fall by the wayside. I thus welcome opportunities to clarify my position, both in general terms and in specific cases.

Looking back at my "Holy Toledo" article from my current perspective, I see several things that I should have done better at the time, and several other respects in which the original text requires updating to reflect advances in the field. In the first category, I feel that I should have explained more clearly that I recognize important distinctions between the patterns of development in natural history and cultural history, something that I hinted at only briefly in the article's concluding paragraph. The crucial point, which I should have made more explicitly, is that natural history generally involves a continuous branching pattern of speciation, in a pattern often described as the 'tree of life,' but that cultural history can involve inspiration from many different sources, resulting in a more richly tangled pattern of 'inheritance.'[8] In rhetorical terms, meanwhile, I feel that I could have more consistently communicated my understanding that concepts such as 'the school of Bourges' are just abstractions useful for describing patterns of cultural exchange in approximate shorthand fashion.

In revisiting my Toledo article, I have chosen to adopt an approach broadly similar to the one Paul Crossley took in revising Paul Frankl's survey text on Gothic architecture: I have provided a reflective introduction, and I have preserved the language of the original text to the greatest extent possible, except

7 The articles are "Pros and Cons of Stratigraphic Models in Art History," *Res* 40 (Autumn, 2001): 77–87, and "Art, Science, and Evolution," in *Making Art History: A Changing Discipline and Its Institutions*, ed. Elizabeth Mansfield (New York, 2007), 187–201. The talk was "Making the Case for Evolutionism in Art History," delivered at the College Art Association Annual Conference in Dallas, Texas, February, 2008. The book in which I discuss Darwinian language most extensively is *Late Gothic Architecture: Its Evolution, Extinction, and Reception* (Turnhout, 2018).

8 The basically tree-like structure of evolutionary speciation can become locally tangled by exotic phenomena such as gene-splicing, and by the exchange of genetic material between lineages that appears to have taken place very early in the history of life. On Darwin's early experimentation with looped alternative to the tree diagram, see Horst Bredekamp, *Darwin's Corals* (Berlin, 2019).

where it has been necessary to update references to take account of advances in the field.[9] Most notably, I have sought to incorporate the insights of Tom Nickson's recent work, which has greatly enhanced the modern scholarly understanding of Toledo Cathedral.[10] I have also acknowledged the work of Michel Bouttier, whose proposals about the early history of Le Mans Cathedral have encouraged me to think more critically about the relationship between the Toledo and Le Mans workshops, and I have added a number of other recent references that should help to bring my apparatus up to date.[11] In broad terms, though, my article remains very much as it was when first published, and its argument remains grounded in the 'Holy Toledo' moment that I enjoyed at Santa Cruz back in 1991. Ironically enough, therefore, my thinking on evolution actually has not evolved that much in the intervening decades, but I hope that this lightly updated essay may nevertheless prove useful for a new generation of readers.[12]

2 Revision

In art history as in biology, the act of classification constrains and informs interpretation. As Darwin developed his theory of biological evolution, he relied on a taxonomic system inherited from his predecessor Linnaeus.[13] Like many art-historical taxonomies, Linnaeus's was based on the examination of formal similarities. However, while modern biologists have been able to confirm and refine Linnaeus's classification scheme using DNA analysis, architectural historians have no such tool to endorse their choice of taxonomies. This proves all the more true when studying the Middle Ages, a period from which all too few explicit statements of artistic intentionality survive.

The story of medieval architecture has been constructed on an armature of taxonomic categories that—hopefully—reflect the perceptions and intentions of that era. Historical plausibility of this kind has often been sought in the close analysis of details. In the case of Gothic architecture, tracery patterns,

9 Paul Crossley and Paul Frankl, *Gothic Architecture* (New Haven, 2000).

10 Most notably, see Tom Nickson, *Toledo Cathedral: Building Histories in Medieval Castile* (University Park, 2016).

11 On these early campaigns in particular, see Michel Bouttier, "Le chevet de la cathédrale du Mans: Recherches sur le premier project," *Bulletin monumental* 161, no. 4 (2003): 291–306. More generally, see also Michel Bouttier, *La cathédrale du Mans* (Le Mans, 2000).

12 From this perspective, my article might thus be compared to 'living fossils' like sharks and crocodilians, which remain much as their ancestors were hundreds of millions of years ago.

13 See, for instance, Stephen J. Gould, "The First Unmasking of Nature," *Natural History* (April 1993): 14–21.

molding profiles, and stone-cutting techniques have all been seen as clues to the links between workshops.[14] Because of their direct association with the day-to-day details of workshop practice, these indices provide insight into the creative processes of architecture at the 'genetic' level

A very different taxonomy results when the symbolic resonance and programmatic intention behind medieval buildings are taken into account. Indeed, it is precisely this quality of human intentionality that breaks down the analogy between biology and art. As Krautheimer demonstrated decades ago, medieval builders might emulate a prototype of which they had only limited direct knowledge.[15] Numerous 'copies' of Saint Peter's Basilica in Rome and the Holy Sepulcher in Jerusalem attest to this fact. The design of Westminster Abbey evokes that of Reims, not because Henry III's masons were trained in France, but because Reims provided a prestigious model for a coronation church.[16] Such formally imprecise references reveal the limitations of the quasi-genetic taxonomies described above. Conversely, however, taxonomies based on symbolic meaning alone cannot explain the detailed process of artistic creativity that makes each building a unique work of art in its own right.

In an effort to find a fruitful middle path between these methodological extremes, historians of medieval architecture have postulated the existence of 'schools' or 'families' of buildings related to each other in the broader outlines of their design. The three 'classic' cathedrals of Chartres, Reims, and Amiens, for example, have often been grouped together because of their generally similar features of plan and elevation, even though their 'genetic' details differ significantly.[17] Expanding this taxonomy into an historical narrative, Jean Bony saw these buildings as representative of a Chartrain school whose dramatic innovations were accepted or resisted to varying degrees by builders outside this tradition. Both Bony and Robert Branner saw the Cathedral of Bourges

14 For instance, Edward A. Freeman, *An Essay on the Origin and Development of Window Tracery in England* (London, 1851); Dieter Kimpel, "Le développement de la taille en série dans l'architecture médiévale et son rôle dans l'histoire économique," in *Bulletin Monumental* 135, no. 3 (1977): 195–222, Richard Morris, "Mouldings and the Analysis of Medieval Style," in *Medieval Architecture and Its Intellectual Context: Studies in Honour of Peter Kidson*, ed. Paul Crossley and Eric Fernie (London, 1990), 239–58, and Stephen Hart, *Medieval Church Window Tracery in England* (Woodbridge, 2010).

15 Richard Krautheimer, "An Introduction to the Iconography of Medieval Architecture," *Journal of the Warburg and Courtauld Institutes* 5 (1942): 1–33.

16 See Christopher Wilson, "La Cathédrale de Reims et l'abbatiale de Westminster," in *La Cathédrale de Reims*, ed. Patrick Demouy (Paris, 2017), 273–86.

17 See, for example, Hans Jantzen, *High Gothic: The Classic Cathedrals of Chartres, Reims, and Amiens*, trans. James Palmes (New York, 1962).

as the most outstanding alternative to Chartres, an alternative that eventually produced a school or filiation of its own.[18]

The neatness of this classification scheme breaks down in cases of complex artistic synthesis, as the example of Beauvais Cathedral demonstrates. Bony saw Beauvais as a member of the Chartres series, in large part because of its tall clerestory and crisp bay articulation. Branner, however, insisted on the resemblance between Beauvais and Bourges, and although he admitted that Beauvais did not belong to the immediate 'family' of Bourges, he saw Bourges as an important precedent for the dramatic pyramidal organization of space seen at Beauvais.[19] More recently, Stephen Murray has attempted to liberate the first master of Beauvais from the Procrustean bed of the Chartres-Bourges classification scheme, arguing for a more inclusive picture that takes account of both his bold originality and his knowledge of older sources such as Notre-Dame in Paris and Cluny III.[20]

A rather different challenge to the traditional view of the Bourges-vs-Chartres taxonomy has been raised by Jürgen Michler.[21] Bony, Branner, and most subsequent scholars have seen Chartres as the more influential of the two buildings, noting that the large clerestories, four-part vaults, and simple basilican elevation of Chartres appear in many later churches, while the six-part vaults, pyramidal massing, and smooth exterior silhouette of Bourges remained relatively rare. Michler, however, argues that the cantonnated piers of Chartres, Reims, and Amiens are residually Romanesque in conception, and that Bourges should be seen as more influential than Chartres because its rounded piers and vertically integrated articulation system herald Rayonnant and later Gothic developments. This disagreement clearly shows that our

18 Bony's views concerning the relationship of Chartres to other design currents were expressed already in Jean Bony, "The Resistance to Chartres in Early Thirteenth-Century Architecture," *Journal of the British Archaeological Association* 3rd ser., 20–21 (1957–58): 35–52. These ideas were presented in updated form in Jean Bony, *French Gothic Architecture*, 328–41. The importance of Chartres and Bourges as prototypes is discussed at length by Bony in *French Gothic*, 245–95. Branner argued for the existence of a Bourges School in *The Cathedral of Bourges and Its Place in Gothic Architecture* (1962, repr. Cambridge, MA, 1989), 177–203. He concedes, however, that Chartres was far more influential (*Bourges*, 161).

19 Robert Branner, "Le Maître de la cathédrale de Beauvais," *Art de France* 2 (1962): 77–92; also Branner, *Bourges*, 203. Bony, in *French Gothic*, explains the characteristics of Chartres and its following (224–25) and counts Beauvais as a member of that group (255) before going on to discuss Beauvais on its own terms (288–95).

20 Stephen Murray, *Beauvais Cathedral: Architecture of Transcendence* (Princeton, 1989), 150.

21 Jürgen Michler, "Stellung von Bourges in der gotischen Baukunst," *Wallraf-Richartz Jahrbuch* 41 (1979): 27–86.

choice of taxonomic criteria can shape the perception of artistic influence in the Middle Ages, as in other periods.

On this basis, the question of how medieval artists themselves constructed their classification schemes becomes an important one. Were they concerned primarily with symbolic references like those discussed by Krautheimer, or did they recognize typologies based on more purely formal qualities as well? Christopher Wilson has plausibly argued that the 'great church' was recognized as a category by medieval builders. The great church type was characterized, he believes, by certain morphological features such as a basilican elevation, a complex east end, and the consistent use of vaulting in the context of a fully articulated bay system. Wilson groups together cathedrals, abbeys, and parish churches sharing these features, arguing that, "since the buildings which form this uppermost stratum of Gothic architecture include hardly any features specific to their different institutional functions, and since influences passed freely between them, it is logical and appropriate that they be considered as a single category, namely the 'great church.'"[22] If Wilson is correct in claiming a historical reality for the great church category, perhaps medieval builders and their patrons recognized other, more precise morphological categories. Were five-aisled basilicas, for instance, recognized as a type?

Based on consideration of Toledo Cathedral's 13th-century choir, the present paper argues that precise morphological categories of this kind did indeed play a role in medieval design and planning.[23] This analysis helps to explain the mixture of formal influences seen at Toledo, and it also sheds light on the way the great cathedral projects of northern France were perceived by their contemporaries. In particular, the case of Toledo offers an interesting gloss on the debate about Beauvais Cathedral and its relationship to the 'families' of Chartres and Bourges. Toledo Cathedral has long been recognized as a member of the 'family of Bourges.' Because the construction of Toledo represented one of the first intrusions of the French Gothic style onto Spanish soil, however, the building must have appeared revolutionary in its local context.

22 Wilson, *The Gothic Cathedral*, 3.

23 The most recent and authoritative study of the building, which was not yet published when this essay first appeared, is Nickson, *Toledo Cathedral*. Subsequent footnotes refer to the sources used in the original version of the essay, followed where appropriate by references to the corresponding portions of Nickson's book. Nickson has also published two useful articles that summarize his ideas about the cathedral's chronology and architectural context: "La Catedral: su Historia Constructiva," in *La Catedral Primada de Toledo*, ed. Ramón Gonzálvez Ruiz (Burgos, 2010), 148–61, and "Copying Córdoba? Toledo and Beyond," *The Medieval History Journal* 15, no. 2 (2012): 319–54.

The self-consciously revolutionary and even polemical character of Toledo Cathedral emerges clearly in light of the city's history. Toledo had been a great cultural center under Muslim rule. The capture of the city by Christian armies in 1085 was one of the key events of the Reconquista, culturally as well as militarily. The magnificence of the Muslim achievement greatly enriched Christian perspectives, and may even have contributed to the development of the ribbed vault.[24] The mosque of Toledo was consecrated and converted into a cathedral, despite initial promises of religious tolerance by King Alfonso VI.[25] By the beginning of the 13th century, however, this mosque-cathedral had fallen into disrepair. Especially by comparison to the great new cathedrals of France, this building must have been seen as unworthy of the metropolitan church of Spain. It hardly seems coincidental, therefore, that the Gothic cathedral of Toledo was begun in the episcopate of an archbishop, Rodrigo Jiménez de Rada, who had been educated in Paris.[26] With its great width, the Gothic cathedral obliterated all trace of the former mosque (Figure 17.1).[27] Altogether, it is difficult to escape the impression that the archbishop intended the new building as a manifesto of Christian cultural sophistication.

The early campaigns at Toledo Cathedral are only sparsely documented, but several fragments permit the establishment of a chronology. According to a papal bull of 1222, the archbishop could divert fully a third of the funds from churches within his diocese toward construction. Work on the site had already been undertaken by then, but King Ferdinand III could not participate in the ceremony of laying the first stone until 1226. Building began at the east perimeter of the structure, under the direction of one Martín, named as 'masterworkman of the construction' between 1227 and 1234. Martín was almost certainly a Frenchman, who established the overall outlines of the cathedral design. A second master likely led the mid-century campaigns involving the construction of the inner ambulatory and presbytery, which incorporate cusped arches evidently inspired by Spanish Islamic monuments. More dramatic changes to the design seen in the upper transept and nave were likely

24 This suggestion is made in Bony, *French Gothic*, 13.

25 For information on the Visigothic and Muslim structures on the site of the present cathedral, see Diego Peris Sánchez, ed., *Arquitecturas de Toledo: Del Romano al Gotico* (Toledo, 1991), 421–22. See also Nickson, *Toledo Cathedral*, chapter 1. Nickson's book effectively supplants Fernando Chueca Goitia, *La Catedral de Toledo* (Madrid, 1978).

26 Peris Sánchez, *Arquitecturas*, 426. See also Nickson, *Toledo Cathedral*, chapter 2, esp. 45–48.

27 To place this development at Toledo into a wider national context, see Justin Kroesen, "From Mosques to Cathedrals: Converting Sacred Space During the Spanish Reconquest," *Mediaevistik* 21 (2008): 113–37.

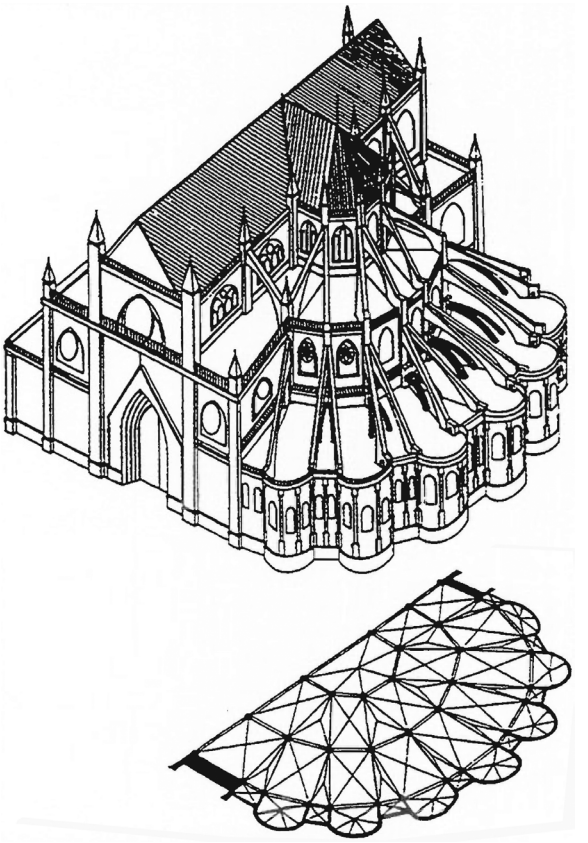

FIGURE 17.1 Toledo, Cathedral of Saint Mary: plan and bird's eye view of chevet (after José María Azcárate, *Arte gótico en España,* Madrid, 1990, frontispiece)

introduced by a third master, Petrus Petri, who died in 1291. It is not the purpose of this paper to propose a new and detailed chronology for work on the cathedral, which is now relatively well understood.[28] Instead, it will explore

28 When considering the authorship of the first campaigns at Toledo, the original version of this essay cited Chueca Goitia, *Toledo*, 36, and Peris Sánchez, *Arquitecturas*, 427. These authors sought to establish the backgrounds and respective contributions of Martin and Petrus Petri, which has now been largely clarified by Nickson's recent work. Nickson dates the first main campaign to the years 1221–44, with the outer ambulatory and its chapels being completed by 1238. He believes that most of the work on the second campaign was accomplished between roughly 1253 and 1263, resulting in the construction of the inner ambulatory, the presbytery, and even the lower portions of the eastern nave bay. The

FIGURE 17.2 Toledo, Cathedral of Saint Mary: interior of transept and chevet
PHOTO: PAUL M.R. MAEYAERT

the ways in which the first leaders of the Toledo workshop drew upon French designs for inspiration, so as to shed light on their ideas about the categorization and classification of Gothic buildings.

The east end of Toledo Cathedral creates a powerful impression through its tremendous width. Even the choir vessel itself is low and broad, and two aisles nearly as wide flank each side (Figures 17.1 and 17.2). These are staggered in height, so that the overall section of the east end is pyramidal. The transepts do not protrude beyond the aisles, giving the building a compact plan. However, the bays flanking the transept all reach the height of the tall inner aisle, so that a continuous corridor of space wraps around the main vessel, transepts and choir alike. As a result, the fullness of the center space is emphasized, and the

lierne vault of the presbytery completed in this campaign would thus be the oldest such vault in Spain. Nickson credits Petrus Petri with a third campaign, undertaken around 1282, in which the windows were dramatically enlarged in the upper transept, setting a precedent followed even in the final campaigns on the nave, which he sees as being complete by 1381, more than a century earlier than assumed previously. See Nickson, *Toledo Cathedral*, chapter 2, and Nickson, "La Catedral: su Historia Constructiva."

transepts are integrated with the eastern arm of the church. This rich piling up of spaces remained nearly unique in Gothic architecture, since it required the presence of both an aisled transept and a pyramidal five-aisle section. To my knowledge, no plausible prototype had yet been proposed for this elaborate configuration.[29] Although perhaps Martín devised the scheme entirely on his own, the reliance of the Toledo workshop on French architectural models strongly suggests otherwise.

Toledo Cathedral has long been recognized as belonging to what Robert Branner called the 'following of Bourges.'[30] The pyramidal elevation, many-shafted cylindrical piers, and main clerestory design of Toledo all suggest the influence of that great French cathedral. The plan of Toledo also resembles that of Bourges, with double ambulatories and small chapels on the perimeter.[31] Toledo has been located within the 'following of Bourges' not only because of its apparent indebtedness to Bourges itself, but also because of its apparent kinship with two other churches closely related to Bourges: the now-destroyed abbey church of Saint Martin in Tours, and the Cathedral of Le Mans (Figure 17.3). The Gothic choir of Saint Martin, begun around 1210, had a pyramidal elevation and a plan closely related to that of Bourges, in which the bays of the outer aisle alternate between trapezoidal and triangular form, so that the five small chapels corresponding to the trapezoidal bays occupy only part of the perimeter. This plan format has the effect of increasing the number of bays as one moves outward from the hemicycle to the exterior wall, as one also sees at Toledo. At Le Mans, where the reconstruction of the choir began in 1217, the chapels are far larger than those of Bourges, Tours, or Toledo, but the vault of the outer ambulatory resembles that of Toledo even more closely, alternating between rectangular and triangular bays, in which the latter have Y-shaped triradial rib patterns. At both Le Mans and Toledo, moreover, bifurcated Y-shaped flying buttresses were eventually built over these triangular bays. The tall format of the current Le Mans flyers seems to have been established only in the 1230s, perhaps in conjunction with the adoption of the ambitious pyramidal elevation scheme, but the close analogies

29 That is to say, none had been proposed prior to this article's original publication in 1997. Nickson has graciously cited its arguments about the spatial similarities between the Toledo and Beauvais transepts in his own subsequent and far more detailed publications on Toledo. See "La Catedral," n. 29; "Copying Córdoba?," n. 39; *Toledo Cathedral*, chapter 4, n. 35.

30 Branner, *Bourges*, 177–201.

31 Branner points out the diminutive, square-planned chapels of Sainte-Croix at Étampes, a relatively small building that itself served as a source for Bourges. See Branner, *Bourges*, 192. As noted below, this observation does not challenge the idea that Toledo belongs to the 'following of Bourges.'

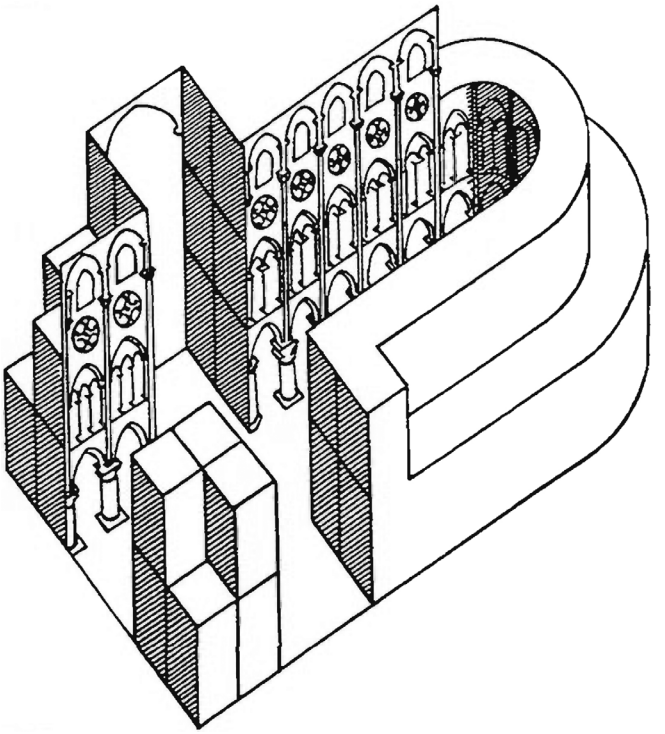

FIGURE 17.3 Paris, Cathedral of Notre-Dame: diagram of spatial structure of east end (after Jean Bony, *French Gothic Architecture of the Twelfth and Thirteenth Centuries*, Berkeley, 1983, 141, fig. 133)

between all of these projects strongly support the idea that something like a 'school of Bourges' was recognized at least implicitly in the 13th century, as well as in 20th-century scholarship.[32]

32 The original version of this article made no mention of Saint-Martin in Tours, and it presented the bifurcated flyers of Toledo as derivatives of those in Le Mans. The current version includes Tours, not only because its relationship to Toledo has been clarified by Nickson, but also because recent digital modeling initiatives have made it easier to visualize this relationship. See, for example, the results of the Revis-Martin project, available at http://patrimoine.dripmoon.com/cubeportfolio/film-3d-renaissance-tours/. Accessed 4 September 2020. Conversely, the current text insists less than the original on the idea that the Toledo flyer format derived from Le Mans, because in the meantime Michel Bouttier has proposed that the original design for Le Mans included neither flying buttresses nor a pyramidal elevation; see "Le chevet de la cathédrale du Mans." Bouttier is surely correct in saying that the current tall flyers were not foreseen at the outset of work;

Although membership in this group suffices to explain many features of the Toledo design, the rich spatial morphology of its high-aisled transepts departs decisively from these precedents. Bourges famously has no transept at all, and the east end of Saint Martin at Tours was built up against the surviving Romanesque transept, while the east end of Le Mans remains spatially disconnected from the boxy transept begun in the 14th century. Seen from the exterior at least, the transept of Toledo more closely resembles that of Notre-Dame in Paris (Figures 17.1 and 17.4). At Notre-Dame the galleries of the transept and choir form "L-shaped corridors of space" that rise above the outer aisles in much the same fashion that the inner aisles of Toledo rise above their shorter neighbors on the periphery of the building.[33] The chevet of Notre-Dame also incorporates intersecting secondary flying buttress pairs at the gallery level, providing a likely precedent for the bifurcating flyer format seen at Toledo and Le Mans, which is otherwise quite rare.[34]

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multiple revisions to the Le Mans design have been recognized previously, and the archaeological evidence Bouttier adduces for the post-hoc addition of the buttress uprights into the older structure is incontrovertible. His suggestion that the original designer foresaw a low choir with neither a pyramidal elevation nor flyers of any sort, however, carries less conviction, for two main reasons. First, a low choir of the type he proposes would have been strangely out of proportion with the enormously wide array of radiating chapels. Although Bouttier notes that the financial situation of the Le Mans chapter around 1217 was tenuous, the scale of the chapel complex shows that the first designer already had a far higher degree of ambition than the builders of small churches such as Saint-Yved in Braine that Bouttier invokes in developing his hypothesized low-choir scheme. It thus seems plausible that a taller scheme with a pyramidal Bourges-like elevation may have been foreseen from the start of work in 1217. The second main problem with Bouttier's argument is that the first designer at Le Mans may well have planned to build small flying buttresses, which would not have required the heavy substructures that the current ones do. Evidence for this assertion can be seen at Chartres, where the tall buttress uprights of the chevet rest on surprisingly small substructures, and at Toledo, where the flyers are much lower, as they might well have been in the original design for Le Mans. The bifurcated flyer format seen at both Toledo and Le Mans, in fact, distributes the thrusts so that the outer supports can be smaller than for a concentrated load. This format may well have been foreseen originally in the straight bays of Le Mans, in which the chapel openings alternate with small triangular bays like those seen in the chevet. Since these triangular bays were an integral part of the ground plan established from the very start of work, the first Le Mans design may well have influenced Master Martín's original scheme for Toledo, even if the bifurcated flyers were a later addition. These triangular ambulatory vaults matter particularly for the history of Toledo, because their Y-shaped rib patterns seem to be the inspiration for the similar pattern seen in the innovative lierne vault of the presbytery.

33 The phrase is borrowed from Murray, *Beauvais*, 150. The spatial configuration of Notre-Dame is eloquently discussed by Bony, in *French Gothic*, 140–42.

34 The late Gothic choir of the parish church of Freiburg im Breisgau provides one of the few subsequent examples of this format.

FIGURE 17.4 Toledo, Cathedral of Saint Mary: interior of ambulatory
PHOTO: TOM NICKSON

A connection between Toledo and Paris should not be seen as surprising, since Notre-Dame itself appears to have been an important source for Bourges.[35] Describing both Bourges and Toledo as members of the 'school of Paris' expands the idea of a 'school of Bourges' rather than fundamentally challenging its

35 This point, made already in the original version of his essay, has been strongly reinforced by Nickson.

legitimacy.[36] Toledo, then, begins to emerge as a building in which three successive versions of the same basic theme are welded into one composition. As Bony has observed, "These superimpositions of designs of different dates, coming from two or three chronological layers, reveal a specifically 'peripheral' mode of thinking: as a result of the simultaneous transmission of the heritage of several generations of Gothic inventions, the perspective of history becomes flattened and time loses its normal depth."[37] Toledo may have been 'peripheral' to the French cradle of Gothic design, but Master Martín clearly remained au courant, since closely related structures such as the choir of Le Mans and Saint Martin in Tours had gotten underway a decade or less before work started at Toledo in the 1220s.[38]

The details of Toledo's tall inner aisle, together with its overall spatial complexity, suggest that the Toledo workshop may have been even more up-to-date than previously suspected. In the area where these inner aisles rise above the outer ones, each bay is pierced by a single rosette surmounting a small arcade that resembles a miniature triforium, its Islamicizing Mudéjar-style articulation notwithstanding (Figures 17.2 and 17.5). Nothing of this kind is to be seen in the aisles of Bourges or Le Mans, nor in the galleries of Notre-Dame in Paris. The complex vertical and diagonal vistas opened up through the tall transept and choir aisles of Toledo, moreover, cannot be explained easily in terms of influence from Notre-Dame, an Early Gothic building in which the corresponding volumes are treated as two stacked stories rather than one tall one. Where, then, did these forms come from?

One possibility, of course, is that the complex spatial morphology and unusual aisle elevation of Toledo were entirely original, invented within that building's own workshop. Certainly, the incorporation of Mudéjar details shows a degree of originality, as does the adaptation of French forms to suit a tremendously wide site. On the other hand, Toledo Cathedral represents the assertive and self-conscious importation of the new French architecture into Spain. With no local tradition of Gothic craftsmanship in Toledo, its builders would have been prudent in adhering closely to proven models. The ambitious transept format, in particular, seems unlikely to have emerged in Toledo without some viable prototype. Also, despite the veneer of Mudéjar-style decoration, the architectural forms of Toledo Cathedral generally remain quite

36 As the original version of this essay noted, the same logic explains why the relationship between the chapels of Toledo and Étampes leaves the 'school of Bourges' concept unchallenged. Nickson's subsequent observations about the indebtedness of Toledo's builders to their colleagues in Burgos, similarly, expands this framework rather than contradicting it, since the Burgos workshop also drew inspiration from Bourges. See Nickson, *Toledo Cathedral*, chapter 4.

37 Bony, *French Gothic*, 252.

38 More broadly, Nickson argues throughout *Toledo Cathedral* that Toledo can better be understood not as provincial, but as multicultural and cosmopolitan.

FIGURE 17.5 Beauvais, Cathedral of Saint-Étienne: interior of ambulatory
PHOTO: AUTHOR

close to French precedent. Since Master Martín was likely familiar with the designs of Bourges, Tours, Le Mans, and Paris, the possibility that he knew of other less obvious prototypes also deserves to be considered.

The Cathedral of Beauvais seems at first glance to be a particularly unlikely source for that of Toledo. The legendary height of Beauvais contrasts with the equally emphatic width of Toledo. The vast expanses of glass and staccato rhythms of the northern building could hardly be further removed from the languorous darkness of its southern cousin. The contrasts prove equally dramatic on the exterior. Moreover, while Toledo employs round, many-shafted piers derived from Bourges, the unusual quartered piers of Beauvais seem

FIGURE 17.6 Beauvais, Cathedral of Saint-Étienne: interior of transept and chevet
PHOTO: AUTHOR

more closely related to those of Chartres or Reims. Numerous other stylistic details could be adduced to argue that Toledo and Beauvais bear no relation to one another.

Nevertheless, if one is willing to accept the evidence of morphological generalities as well as stylistic details, the original conceptions of Toledo and Beauvais no longer appear so opposed. In fact, Beauvais alone of major French churches adopts the same ambitious combination of high-aisled transept and pyramidal five-aisle choir as Toledo (Figures 17.2 and 17.6).[39] Also, the aisle clerestory of Beauvais, composed of a single rosette over a small triforium, closely resembles that of Toledo, if allowances are made for the Mudéjar detailing of the latter (Figures 17.4 and 17.5).[40] The occurrence of both of these unusual Toledan features in one French building seems unlikely to have been a coincidence.

As Stephen Murray has demonstrated, construction at Beauvais was begun in the lower stories of the transept. Thus, by roughly 1225, the spatial morphology of the transept had been established. In this section of the building, a large rosette and shallow triforium articulate the outer wall of the inner aisle. Already this format resembles that of Toledo. The match is comparably close in the straight bays of the choir, where the triforia are more delicate and the rosettes are smaller, although these cusped rosettes lack the emphatic tracery petals seen at Toledo. Murray dates this campaign to roughly 1240.[41]

39 Murray, *Beauvais*, 150.

40 This observation is made briefly by Wilson, *Gothic Cathedral*, 158, who sees both buildings as part of the 'family of Bourges,' as noted in *Gothic Cathedral*, 110.

41 Murray, *Beauvais*, 60.

Because of the rough simultaneity of work at Beauvais and Toledo, several different scenarios may be imagined to explain the linkage of the two buildings. If one believes that Master Martín set all the important parameters for the design of Toledo already in the 1220s, then only the transept campaigns of Beauvais could have been known to him. In fact, these campaigns would have begun only a year or so before the laying of the first ceremonial stone at Toledo in 1226. Such a rapid transmission of design information may well have depended on drawings, which could have shown the entire aisle elevation of Beauvais long before its construction was complete. It is also possible that the Toledo builders first began to incorporate ideas from Beauvais only in the 1230s, after completing their cathedral's outer ambulatory.[42] It may well be, finally, that knowledge of the ongoing work at Beauvais came to Toledo on a fairly regular basis, informing both Master Martín's original design and subsequent revisions to its details. Based on chronology alone, however, there is no reason to deny the possibility of a Beauvais–Toledo connection.

Recognition of Beauvais as an important source for Toledo complicates and enriches the taxonomic framework within which each building has been understood. In particular, it suggests that medieval masons and their patrons categorized buildings based on spatial morphology. When construction of Toledo Cathedral was begun in the 1220s, Bourges Le Mans, and Beauvais, were the only French cathedrals with pyramidal five-aisle choirs.[43] The designers of Toledo appear to have synthesized elements drawn from all of them. In fact, with the exception of the Mudéjar decoration, every significant element of Toledo's east end may be traced to one of these buildings, or, as noted above, to Notre-Dame of Paris. Meanwhile, there are no elements of Toledo that seem to depend on the precedents offered by Chartres, Reims, or Amiens, or other great French cathedrals of the day. Perhaps this is because they lacked the pyramidal elevation that constitutes such an important part of the Toledo scheme. Toledo appears to have been designed as a self-conscious synthesis of all the French cathedrals with pyramidal elevations, and no others. This implies both that five-aisled pyramidal churches were recognized as a type and that Beauvais was seen as a member of that group.

Although necessarily hypothetical, it is possible to construct a reasonable historical narrative explaining why this typology made sense in 13th-century

42 Nickson notes that builders may have come from Beauvais to Toledo after the temporary work stoppage at Beauvais in 1232, caused by conflict between the bishop of Beauvais and the king of France. See Nickson, "Copying Córdoba?," 333.

43 The double-aisled choir of Coutances, another structure belonging to the 'following of Bourges' as conceived by Branner, was not under construction until the 1230s. See Branner, *Bourges*, 196–201.

Toledo. To start with, the Gothic cathedral was designed, as matter of pride, to extend over the full site of the former mosque. This practically dictated a five-aisle plan. Archbishop Rodrigo Jiménez de Rada, having been trained in France, no doubt wanted his building to reflect up-to-date Gothic practice. Such ambitions would tend to exclude the galleried format of Notre-Dame, leaving two basic options for the treatment of the five-aisle plan: that of the Chartres choir, with twin aisles of equal height flanking the main vessel, or that of Bourges, with taller inner aisles creating a pyramidal sequence of volumes. The selection of the latter option may reflect concerns about lighting, structural stability, or simply the experience of a mason trained in the tradition of Bourges. Bony suggested that "when the Toledo master visited Bourges *c*.1220, [he] was interested not only in the building itself but in the whole collection of workshop records, which must have included drawings of older buildings used as sources, as well as of recent works belonging to the Bourges filiation."[44] If Beauvais is accepted as a source for the Toledo choir, then this description must be broadened somewhat. Even Branner never argued that Beauvais belonged to the Bourges filiation per se, but the Toledo master seems to have grouped it together with the Bourges family because of its pyramidal elevation. Toledo Cathedral thus appears to have been self-consciously situated within the tradition of French pyramidal churches, all of which find themselves reflected in its design.

Clearly such spatial typologies were not the only taxonomies in use in the Middle Ages, nor should they be the principal component of modern scholarship.[45] It may well be reasonable to speak of Toledo as a member of the 'Bourges family' even if it incorporates influences from Beauvais, a building that differs from Bourges in many respects. However, just as Wilson has found it useful, in his construction of the 'great church' category, to temporarily set aside the distinction between abbeys, cathedrals, and large parish churches, so too it can be instructive, at least in the case of Toledo, to treat the pyramidal section as the most essential quality of its prototypes. After all, Gothic builders were not simply slaves to their training. They often demonstrated an impressive ability to synthesize influences from a wide variety of sources. Therefore, while biologists can rest content with a single classification system, historians

44 Bony, *French Gothic*, 252.

45 In discussing the relationship between Toledo and Le Mans, therefore, Nickson observes both the striking similarities between their plans, and the sharp distinctions between their systems of articulation. See "La Catedral." This underscores the distinction between 'genetic' taxonomies based on craft details, and taxonomies based on broader considerations of spatial planning.

of medieval architecture must be prepared to entertain several. In this spirit, it is hoped that the present paper, by grouping Beauvais and Toledo along with Bourges, Le Mans, and Paris, will contribute to an enriched discussion of High Gothic typology and masonic self-consciousness.

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CHAPTER 18

The Reach of the Gothic: Monastic Architecture and the Intersection of Traditions in Eastern Europe

Alice Isabella Sullivan

Around 1230, Villard de Honnecourt visited Hungary and made several references to the trip in his famous Portfolio.[1] While there, he also recorded a pavement pattern in a local church (Figure 18.1).[2] The design supposedly comes from the now-lost Cistercian royal abbey of Pilis, once situated between Esztergom and Buda.[3] The abbey was founded in the second half of the 12th century by monks from Acey Abbey in France, and thus exhibited Gothic designs and features in its construction and decoration. As Villard's sketches and the extant monuments from the region demonstrate, royal chapels and monasteries in the eastern realms of Europe utilized Gothic building principles to define and accentuate sacred spaces at least from the 12th century onward. The royal chapel at Esztergom Cathedral, dating to the reign of King Béla III (r. 1172–96), is another noteworthy early Gothic structure in the region, as is the Porta Coeli ("Heaven's Gate") Convent in Tišnov (near Brno, Czech Republic). The latter, a foundation of Queen Constance of Hungary, wife of the Bohemian King Přemysl Otakar I (r. 1198–1230), displays Gothic elements akin to those found in monasteries in northern France and Austria. Farther to the east, in the Transylvanian region of the Carpathian Mountains, which was

1 For example, fol. 10v carries a relevant inscription: "I had been sent into the land of Hungary [le tierre de hongrie] when I drew it because I like it best." The reference here is to a window at Reims Cathedral, which Villard drew prior to his departure east. Bibliothèque nationale de France, MS Fr 19093, accessed 5 January 2022, https://images.bnf.fr/#/detail/673688/1. See also Carl F. Barnes and Lon R. Shelby, "The Codicology of the Portfolio of Villard de Honnecourt (Paris, Bibliothèque nationale, MS FR. 19093)," *Scriptorium* 42, no. 1 (1988): 20–48. Carl F. Barnes, *The Portfolio of Villard de Honnecourt (Paris, Bibliothèque nationale de France, MS Fr 19093): A New Critical Edition and Color Facsimile with a Glossary by Stacey L. Hahn* (London, 2017).

2 The pavement pattern appears in the upper portion of fol. 15v, Bibliothèque nationale de France, MS Fr 19093, accessed 5 January 2022, https://images.bnf.fr/#/detail/936597/1.

3 See Imre Takács, "The French Connection: On the Courtenay Family and Villard de Honnecourt Apropos of a 13th-Century Incised Slab from Pilis Abbey," in *Künstlerische Wechselwirkungen in Mitteleuropa*, ed. Jirí Fajt and Markus Hörsch (Ostfildern, 2006), 11–21.

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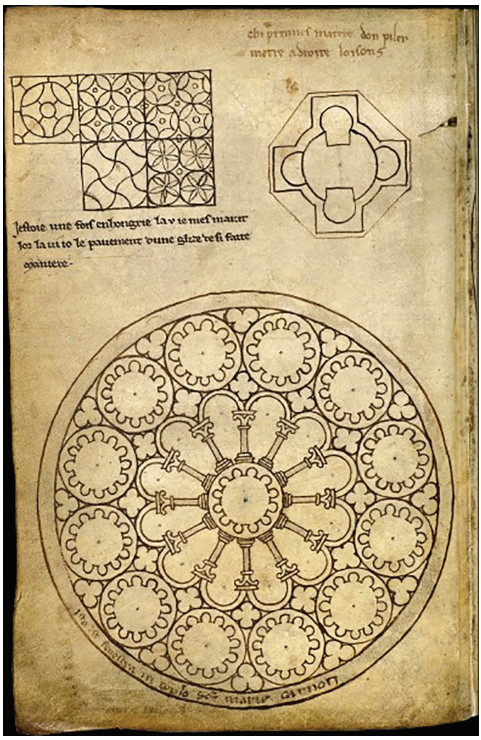

FIGURE 18.1
Portfolio of Villard de Honnecourt, fol. 15v: drawing of a pavement pattern in a Hungarian church [upper left image] (Paris, Bibliothèque nationale de France, MS fr. 19093)
REPRODUCED BY PERMISSION OF THE BNF

part of the Hungarian Kingdom in the Middle Ages, the Cistercians established prominent abbeys in Cârța (near Sibiu) and Igriș (near Arad).[4] The still extant 12th-century basilican church at Cârța reveals Gothic building techniques and features, especially evident in the polygonal choir, the quadripartite and six-partite rib vaults of the interior, as well as the window tracery. Such examples demonstrate the reach of the Gothic in regions of Europe far beyond France, as well as aspects of the transmission, adaptation, and possible meanings of Gothic building practices, designs, and motifs in eastern European contexts.

For much of the late Middle Ages, the regions of the Balkan Peninsula and the Carpathian Mountains in Eastern Europe developed at the intersection of competing traditions and worldviews, among them Latin, Greek, and Slavic. The rich artistic and architectural landscapes of this area—although little studied outside local scholarly circles—offer insight into the kinds of negotiations that unfolded between different visual idioms. Some of the most dynamic and eclectic visual schemes are found in the ecclesiastical sphere,

4 Dragoș Gh Năstăsoiu, *Gothic Art in Romania* (Bucharest, 2011), 30–35 and 50–68.

especially in the Eastern Christian monasteries that were built under princely patronage along the eastern slopes of the Carpathian Mountains in the former principality of Moldavia (Figure 18.2). After the fall of Constantinople in 1453, Moldavia—a territory extending within the borders of northeastern modern Romania and the Republic of Moldova—assumed an important role in the continuation and transformation of aspects of the Byzantine-Slavic heritage alongside western Gothic modes of building and decorating religious edifices. This eclecticism with respect to sources is most evident in the main monastic churches (or *katholika*) built initially under the patronage of Prince Stephen III "the Great" (r. 1457–1504) and then further developed with support from his illegitimate son and heir, Prince Peter Rareș (r. 1527–38; 1541–46).[5] Their successors continued this tradition of building and endowing monasteries, but the later enterprises were not as numerous nor as noteworthy from architectural and artistic standpoints.

The Romanian historian Gheorghe Balș characterized the Moldavian ecclesiastical monuments of the 15th and 16th centuries as "Byzantine churches built with Gothic hands and following principles that were in part Gothic."[6] Indeed, the layout of the churches and the nature of their interior spaces, dimly lit and with extensive image cycles in multiple registers entirely covering the walls demonstrate affinities with Byzantine and Slavic church building and decorating traditions. Other features, most notably the large three-tier buttresses set against the thick walls, the curvilinear tracery found in the upper sections of the windows, and the receding pointed arches of the door frames derive mainly from Gothic models predominant in church architecture in central and western Europe. Yet still other elements of these religious buildings are of a local character, such as the elongated proportions of the triconch plan, the supports of the domes, and the translation of certain iconographic themes, which developed in efforts to fulfill particular needs of the patron and the community at large. In this guise, the Moldavian churches present an exceptional synthesis of eastern- and western-inspired aesthetic and symbolic conventions adapted for a local context.

5 See Alice Isabella Sullivan, "The Painted Fortified Monastic Churches of Moldavia: Bastions of Orthodoxy in a Post-Byzantine World" (PhD dissertation, University of Michigan, 2017); Alice Isabella Sullivan, Vladimir Ivanovici, and Gabriel-Dinu Herea, "Space, Image, Light: Toward an Understanding of Moldavian Architecture in the Fifteenth Century," *Gesta* 60, no. 1 (2021): 81–100. On the topic of eclecticism in the art, architecture, and visual culture of Eastern Europe, see Maria Alessia Rossi, and Alice Isabella Sullivan, eds., *Eclecticism in Late Medieval Visual Culture at the Crossroads of the Latin, Greek, and Slavic Traditions* (Berlin, 2022).

6 Gheorghe Balș, *Bisericile lui Ștefan cel Mare* (Bucharest, 1926), 14. The reference to "Gothic hands" is in relation to masons trained in workshops that followed mainly Gothic principles and designs.

FIGURE 18.2 Map of Europe *c.*1550 showing the principality of Moldavia
PHOTO: ANDREI NACU

FIGURE 18.3 Moldavia (modern Romania), Probota Monastery, Church of Saint Nicholas, 1530–35: view from the south
PHOTO A. I. SULLIVAN

Whereas Stephen III built dozens of churches and chapels that gradually transformed the sacred landscape of Moldavia,[7] it was under Peter's patronage that architectural forms were consolidated in individual buildings, and older churches and newly built ones received extensive murals both inside and outside.[8] A noteworthy example, which serves as the case study for the discussion to follow, is the Church of Saint Nicholas at Probota Monastery, built and decorated under Peter's aegis beginning in 1530 (Figures 18.3 and 18.4). The dedicatory inscription written in Church Slavonic and set above eye level to the right of the main entrance into the *katholikon* reads:

> Through the blessing of the Father, the instruction of the Son, and the action of the Holy Spirit, I, John Peter voivode,[9] through God's grace prince of the land of Moldavia, son of the old Stephen voivode, managed

7 On Stephen III's patronage and the new sacred landscape of Moldavia, see Alice Isabella Sullivan, "The Athonite Patronage of Stephen III of Moldavia, 1457–1504," *Speculum* 94, no. 1 (2019): 1–46, esp. 41–44.

8 Alice Isabella Sullivan, "Moldavian Art and Architecture between Byzantium and the West," in *Byzantium in Eastern European Visual Culture in the Late Middle Ages*, ed. Maria Alessia Rossi and Alice Isabella Sullivan (Leiden, 2020), 200–31.

9 A voivode (Vojvoda or Wojewoda) is a Slavic title denoting a ruler in the Eastern European cultural context.

FIGURE 18.4 Moldavia (modern Romania), Church of Saint Nicholas, 1530–35: view from the southeast, Probota Monastery, Moldavia, modern Romania
PHOTO A. I. SULLIVAN

> by my good will to build this edifice dedicated to the hierarch and wonderworker Nicholas during the fourth year of my reign; during [the time of] hegumenos kyr Grigore, in the year 7038 [1530], in October.[10]

Designed from the outset as a princely mausoleum, the monastic church at Probota was built on an elongated triconch plan derived from Byzantine and Slavic models, yet also integrates distinctly Gothic features. This building offers aspects of key contemporary architectural and iconographic developments in Moldavian church architecture, and insight into how the mural cycles were designed in dialog with the distinctive spaces of the building and their ritual functions. As this study explains, the *katholikon* at Probota demonstrates how this new style of church architecture developed in Moldavia relative to Byzantine, Slavic, and western Gothic models by the early decades of the 16th century. Moreover, the examination of this one monument brings to light issues of patronage and

10 Nicolae Iorga, *Inscripții din bisericile României* (Bucharest, 1905), I, 56 (Church Slavonic; Romanian). The dates of the Moldavian dedicatory inscriptions are offered according to the Byzantine Calendar.

commemoration in the Orthodox monastic context, as well as aspects of workshop practices in regions of the Carpathians and the reach of Gothic design and building practices beyond the more established centers of activity.

1 Probota Monastery

The history of Probota Monastery dates to at least the second half of the 14th century. The initial church, dedicated to Saint Nicholas, was a wooden structure. By the second half of the 15th century, Stephen III had already relocated the monastery (Old Probota) closer to the river and rebuilt it in stone between 1464 and 1465. The new church was designed from the outset with a special barrel-vaulted funerary room in which Stephen's mother, Oltea (d. 4 November 1465), and his first wife, Evdochia of Kyiv (d. 4 September 1467), found their eternal resting places.[11] This is arguably the first Moldavian church to contain a distinct funerary room in its layout.[12] The building, however, suffered damages over the years due to earthquakes and landslides, and so when Peter decided to rebuild the edifice, he relocated the entire monastic complex about 200 m west of Stephen's church, away from the river. Now on firmer ground, the monastery was to be expertly built, beautifully decorated, and expensively endowed so as to reflect its status as a princely mausoleum.

Peter built Probota to serve this important function for himself and his immediate family just like his father, Stephen III, designated Putna Monastery as his mausoleum more than 60 years earlier.[13] The *katholika* at Putna and Probota were thus allocated special roles within the grander political and ideological agendas of these two Moldavian rulers. But whereas little can be reconstructed of the original church at Putna, as the building has had several major transformations over the course of its history, Probota preserves more of its original form and decorations, offering insight into the eclectic visual and

11 For their funerary inscriptions, see Mihai Berza, ed., *Repertoriul monumentelor și operelor de artă din timpul lui Ștefan cel Mare* (Bucharest, 1958), 60 and 246 (Church Slavonic; Romanian).

12 Lia Bătrâna and Adrian Bătrâna, "O primă ctitorie și necropolă voievodală datorată lui Ștefan cel Mare: Mănăstirea Probota," *Studii și Cercetări de Istoria Artei, Seria Arte Plastice* 24 (1977): 205–29, esp. 221–22, figs. 3 and 9 (for the plan of the initial churches at Probota); Lia Bătrâna and Adrian Bătrâna, "Date noi cu privire la prima ctitorie datorată lui Ștefan cel Mare: Mănăstirea Probota," *Mitropolia Moldovei și Sucevei* 53, nos. 7–9 (1977): 586–99; Gheorghe Buzatu, "Biserica fostei mănăstiri Probota," in *Monumente istorice bisericești din Mitropolia Moldovei și Sucevei* (Iași, 1974), 176–80.

13 See *Holy Putna Monastery* (Putna, 2016), esp. 47–56.

spatial vocabularies of Moldavian monastic churches—and especially princely mausolea—as they developed by the early decades of the 16th century.

At Probota Monastery, the *katholikon* was built first, and the surrounding buildings were then erected.[14] The treasury house and the princely residence are located to the northwest of the church, while the living quarters of the nuns extend to the west. The building of the superior and the administrative office, the kitchen, and the refectory once stood to the south of the *katholikon*. Massive rectilinear fortification walls measuring approximately 90 × 90 m and 5 m in height surround the complex, setting the monastery apart from the rest of the world and offering defense in times of need. The rectilinear layout of Probota emulates that of monasteries on Mount Athos and across other regions in the Byzantine cultural sphere.[15] However, this rectilinear layout differs markedly from the polygonal configuration of monasteries in the Balkans, for example, which suggests that certain architectural ideas were transferred directly without zones of mediation for artistic and architectural ideas through the Balkans.

In 1550, Peter's wife, Princess Elena, and their children, Iliaș, Stephen, and Constantine, reinforced the fortification walls at Probota. The inscription commemorating their efforts is still preserved around Moldavia's coat of arms at the center of the gate tower (Figure 18.5). On the main gate tower, moreover, a niche above this inscription displays an image of Saint Nicholas to whom the church is dedicated. To either side, a register preserves remnants of mural decoration with standing figures that once showed in vibrant colors the patron of the monastery, Peter Rareș, alongside members of his immediate family. During the 17th century, the fortification walls and the buildings in the monastic compound were once again restored and rebuilt, initially with support from Prince Basil Lupu (r. 1634–53) who devoted resources to the restoration of Moldavian monuments erected by his royal predecessors.[16] In so doing, he followed in the footsteps of his ancestors, Peter included, who took a keen interest in the preservation of local monuments while contributing to new building projects.[17]

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14 For a diagram of the layout, see Gheorghe Balș, *Bisericile și mănăstirile moldovenești din veacul al XVI-lea: 1527–1582* (Bucharest, 1928), fig. 223.

15 See Sotiris Voyatzis, "Evidence on the Building History of the Holy Monastery of the Great Lavra on Mount Athos: The Gateway in the Circuit Wall," *Deltion tes Christianikes Archaiologikes Hetaireias* 21, no. 4 (2000): 55–68.

16 See Ana Dobjanschi and Victor Simion, *Arta în epoca lui Vasile Lupu*; Șerban, *Vasile Lupu, domn al Moldovei: 1634–1653* (Bucharest, 1979); Constantin Șerban, *Vasile Lupu, domn al Moldovei: 1634–1653* (Bucharest, 1991); Ștefan S. Gorovei, *"Io Vasile Lupu, domn al Țării Moldovei": 360 ani de la urcarea pe tron* (Iași, 1994).

17 See Alice Isabella Sullivan, "A Post-Byzantine Visual Idiom in Moldavian Art and Architecture," in *Afterlife of Byzantine Monuments in Post-Byzantine Times*, special issue *Études Byzantines et Post-Byzantines III* (*X*), ed. Elena Boeck (Bucharest, 2021), 57–82.

FIGURE 18.5 Moldavia (modern Romania), Probota Monastery: main gate tower with dedicatory inscription and murals from 1550
PHOTO A. I. SULLIVAN

As such, the sacred landscape of Moldavia was maintained and expanded over the course of several generations.

2 The Probota *Katholikon* between Competing Traditions

The monastic church at Probota draws on Byzantine, Slavic, and Gothic church building traditions alongside forms developed locally. The church, built out of local stone and rubble, is relatively large in scale for the region, measuring 36.2 m in length, 9.5 m in width, and with a height of 30 m under the main dome. The layout is an elongated triconch (Figure 18.6). It consists of a closed barrel-vaulted *exonarthex* at the west end that opens through a small doorway into a double-domed rectangular *pronaos* with four large windows, two facing

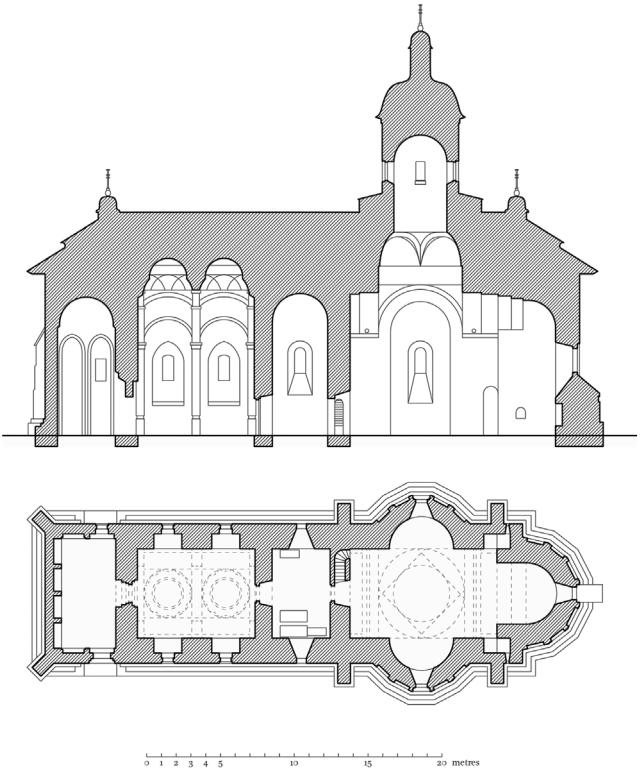

FIGURE 18.6 Moldavia (modern Romania), Probota Monastery, Church of Saint Nicholas, 1530–35: plan and elevation
SOURCE: RICHARD THOMSON (RT-IMAGERY.COM)

north and two facing south. This space, in turn, leads through another small entryway into the burial chamber (*gropniță*).[18] The burial chamber at Probota is rectangular in shape with a barrel vault reaching the same height as the *pronaos* of the church.[19] This room, with a small window on each of the lateral walls, gives access through another small entrance to the triconch *naos* where the liturgical ceremonies unfold. The *naos* comprises a central rectangular space with two lateral semicircular apses extending to the north and south.

18 The term *gropniță* to denote the burial chamber is derived from the term for grave: гробь in Church Slavonic; *groapă* in Romanian; *Grab* in German. The Church Slavonic version appears repeatedly in the dedicatory inscriptions sculpted on the gravestones.

19 Other Moldavian churches contain funerary rooms with lowered ceilings and a secret treasury room above (*tainiță* or *bașcă*). This is evident, for example, at Moldovița Monastery (1532–37). The lowered ceiling of the burial chamber accentuates the transition from this funerary room into the more visually and spatially complex space of the *naos*.

Each apse is covered by a semicircular dome and each has one central window opening of the same dimensions as the windows found in the burial chamber. The side apses are semicircular on the interior and five-sided on the exterior. The altar area (chancel or bema), semicircular on the inside and seven-sided on the outside, extends to the east. This space is separated from the *naos* by a series of thick arches and a large carved and gilded iconostasis with painted icons in multiple registers.[20] Immediately beyond the iconostasis, to either side of the apse, two smaller rooms, known as *pastophoria*, each illuminated by a single small window, stand to the north and south; they respectively are the *prothesis*, where the holy vessels are stored and the offerings are prepared for the liturgical celebrations, and the *diaconicon*, which houses the liturgical vestments. The interior of the church thus comprises a longitudinal progression of spaces of different dimensions, and serving diverse functions, which grow darker as one approaches the altar area.

The layout of the *katholikon* at Probota interprets the triconch plan characteristic of churches in Constantinople, Thessaloniki, and especially on Mount Athos. The architect and historian Paul Mylonas was the first to suggest that this plan developed initially in the Athonite churches, and in particular in the *katholikon* of the Great Lavra Monastery on the Holy Mountain, founded in 963.[21] According to Mylonas—although the idea has been challenged—the triconch plan was designed in order to facilitate the antiphonal singing of the choirs of monks that assembled in these spaces for liturgical duty.[22] It seems certain that monastic worship favored especially this type of triconch plan. As such, it may best be understood, as Robert G. Ousterhout suggests, as a "regional phenomenon" limited to the monastic communities on Mount Athos and to related areas in northern Greece and the Balkan Peninsula.[23] As the extant monuments reveal, this plan was appropriated as well in the north-Danubian

20 On the iconostasis, see Pavel Florensky, *Iconostasis* (1922), trans. Donald Sheehan and Olga Andrejev (Crestwood, 1996); Alexei Lidov, ed., *The Iconostasis: Origins—Evolution—Symbolism* (Moscow, 2000); Sharon Gerstel, ed., *Thresholds of the Sacred: Architectural, Art Historical, Liturgical, and Theological Perspectives on Religious Screen, East and West* (Washington, D.C., 2006).

21 Paul Mylonas, "Le plan initial du catholicon de la Grande-Lavra au Mont Athos et la genèse du type du catholicon Athonite," *Cahiers archéologiques* 32 (1984): 89–112.

22 This is visualized, for example, in an 18th-century drawing by the Ukrainian monk and pilgrim Vasilli Grigorovich Barskij that shows a service in the interior of the Great Lavra *katholikon* in which the monks are positioned around the apses. Katholikon of the Great Lavra, Mount Athos, lithograph of an older pen and ink drawing, Vassily Barsky, monk from Kyiv, drawing 1744, lithograph 1887. Paul Mylonas, *Athos and Its Monastic Institutions through Old Engravings and Other Works of Art* (Athens, 1963), 57, no. 16.

23 Robert G. Ousterhout, *Master Builders of Byzantium* (Princeton, 1999), 18.

territories: Wallachian and Moldavian monastic churches employed the triconch layout from as early as the second half of the 14th century.[24] But, in these Carpathian regions, and especially in Moldavia, the triconch plan was elongated toward the west by the additions of the burial chamber, *pronaos*, and *exonarthex*, which further transformed and adapted this traditional layout in a local context.

Local developments have also informed the architectural features of the *katholikon* at Probota. This is evident in the design of the domes rising over the *pronaos* and *naos*, which offer an alternative to the traditional pendentives. So-called oblique arches are found at the transition from the rectilinear space of the *naos* and *pronaos* below to the circular drums of the domes above.[25] The *pronaos* at Probota displays two shallower domes with images of the Virgin Blachernitissa and Saint Anne with the Virgin, while a steeple-like dome rises over the *naos* with a traditional image of Christ Pantokrator (Figure 18.7). The much taller and more slender dome in the *naos* significantly increases the height of this space. The support system of the domes consists of overlapping arches and pendentives, with the upper set at a 45-degree angle to the vertical. This tendency to diminish the span of the domes over the *pronaos* and *naos* of the church in an effort to lend these features more attenuated proportions is also evident in later Byzantine churches found in regions of the Balkans, such as Serbia.[26] Scholars have also proposed models from further east. Gheorghe Balș, for example, suggested that the particular Moldavian vaulting system has precedents in Armenian ecclesiastical buildings.[27] Although the development of this specific vaulting design remains to be studied in more

24 On Serbian and Wallachian triconch churches, see most recently Jelena Bogdanović, "Triconch Churches Sponsored by Serbian and Wallachian Nobility," in *Byzantium in Eastern European Visual Culture in the Late Middle Ages*, ed. Maria Alessia Rossi and Alice Isabella Sullivan (Leiden, 2020), 167–99.

25 On the Moldavian vaulting system and the so-called oblique arches, see Virgil Vătășianu, "Bolțile moldovenești: Originea și evoluția lor istorică," *Anuarul Institutului de Istorie Națională* 5 (1928–30): 415–31; Tamara Nesterov, "Bolta moldovenească: Aport original al meșterilor moldoveni la tezaurul arhitectural universal," *Akademos* 30, no. 3 (2013): 110–19; Ousterhout, *Eastern Medieval Architecture*, 673

26 Slobodan Ćurčić, "The Role of Late Byzantine Thessalonike in Church Architecture in the Balkans," *Dumbarton Oaks Papers* 57 (2003), 67.

27 Balș, *Bisericile lui Ștefan cel Mare*, 14, 188–89. Although most of the text looks at monuments from Wallachia, Balș also discusses additional parallels between Moldavian and Armenian architectural forms in his publication *Influences arméniennes et géorgiennes sur l'architecture roumaine*, esp. 16–17. Balș also discussed this issue at the First Congress of International Byzantine Studies held in Bucharest in 1924, with a talk titled "Sur une particularité des voûtes moldaves." His contribution was later published in *Bulletin de la Section historique de l'Académie roumaine* 11 (1924): 9–24.

FIGURE 18.7 Moldavia (modern Romania), Probota Monastery, Church of Saint Nicholas, 1530–35: dome of naos, interior
PHOTO A. I. SULLIVAN

detail, it offers, nevertheless, an intricate visual scheme at the point of transition to the dome above the *pronaos* and *naos*, and additional surfaces for painted decorations.

The murals of the *katholikon* at Probota, as with other similar monuments from the region, display an iconography and style rooted in Byzantine and Slavic models. The images were carefully calibrated to enhance and give visual expression to the specific purpose of the part of the building on which they were painted—some were even adapted to address princely and local needs and concerns. The extensive image cycles set in multiple registers on the interior walls of the *pronaos* and burial chamber show scenes from the *Menologium*—the texts describing the religious feasts and martyrdoms of Orthodox saints corresponding to each day of the year (Figure 18.8). Each register shows saints celebrated in a particular month—thus the images wrap clockwise around the spaces of the *pronaos* and the burial chamber from top to bottom, visualizing a passage of earthly time on the inner walls of the church.[28] At

28 On the *Menologium* in the Moldavian cultural context, see Ecaterina Cincheza-Buculei, "Menologul de la Dobrovăț (1529)," *Studii și Cercetări de Istoria Artei, Seria Arte Plastice* 39 (1992): 7–32; idem, "Le programme iconographique des peintures murales de la chambre des tombeaux de l'église du monastère de Dobrovăț," *Cahiers Balkaniques* 21 (1994): 21–58.

FIGURE 18.8
Moldavia (modern Romania), Probota Monastery, Church of Saint Nicholas, 1530–35: interior, west wall of pronaos with scenes from the Menologium
PHOTO A. I. SULLIVAN

Probota, the first six months of the *Menologium* (September–February) appear in the burial chamber, and the last six months of the liturgical year (March-August) in the *pronaos*.[29] In the *pronaos*, March, May, and June begin on the east wall and continue on the south wall, while April, June, and August start on the west wall and continue on the north wall (three registers). Thus, the order is reversed; time is fashioned from the *naos* westward.

The burial chamber, *pronaos*, and *exonarthex* were designed to serve as "additions" to the main triconch liturgical space of the church. These paraliturgical rooms of preparation were further defined as such by the classical meander pattern (labyrinth-like) still visible at Probota in the burial chamber.[30] This visual element signaled the physical and spiritual passage from the spaces that symbolize the "lived" or "seen" world toward the *naos* and the altar that indicate the

29 The Byzantine Calendar begins on 1 September. At Probota, the cycle begins in the north corner of the east wall of the *pronaos* and circles the room; each month takes up a register on two walls.

30 Gabriel Herea, *Pelerinaj în spațiul sacru Bucovinean* (Cluj-Napoca, 2010), esp. 22–28.

"unseen" or the "divine" sphere. This journey, so to speak, is further accentuated physically by the presence of the burial chamber, which stresses mortality and encourages a moment of pause and contemplation before entering the more sacred, and more visually and architecturally elaborate, area of the *naos*. The ultimate goal was to pass into the *naos* and stand under the great Pantokrator in the dome in the right spiritual mindset for the celebrations of the Divine Liturgy.

Further reflecting Byzantine traditions of church decoration, the interior of the *naos* received scenes from the life of Christ and the Virgin, representations of full-length figures of military saints, and a votive painting that shows Peter and his immediate family presenting a model of the church to Christ via the intercessory role of Saint Nicholas to whom the church is dedicated.[31] The altar continues the cycle of images found in the *naos*. The main altar dome features an image of the Virgin and Child enthroned among angels. Moreover, in addition to the standard Eucharistic iconography of the *Last Supper* and the *Communion of the Apostles*, supplementary narrative scenes appear such as *Christ and the Samaritan Woman*, the *Doubting Thomas*, the *Healing of the Paralyzed Man*, the *Healing of the Blind Man*, among others. These scenes emphasize Christ's healing powers and the truth of the message. The increased height of the *katholikon* at Probota, and other Orthodox-rite Moldavian churches, allowed for larger wall surfaces and the inclusion of additional religious scenes, such as Christ's miracles, which appear in Byzantine and Serbian monumental mural cycles.[32] This suggests that the conception (and execution) of the Moldavian frescoes came about both through direct Byzantine models and other examples mediated through regions of the Balkans, such as Serbia, Bulgaria, and Macedonia, with which Moldavia established connections especially through the Orthodox Church. As such, at Peter's princely mausoleum at Probota the most extravagant display of images decorates the altar and *naos*, continuing into the burial chamber, *pronaos*, and *exonarthex*, and then extending onto the exterior walls of the building.

Unlike the vibrant interior murals, the exterior images are in a much poorer state of preservation. Nevertheless, key themes remain visible and conform with the program found painted at other local churches. In contrast to the predominantly narrative mode of representation characteristic of the majority of

31 The votive mural at Probota shows Peter Rareș, his wife Elena, and their children Iliaș, Stephen, Constantine, and Ruxandra. The mural was altered twice: 1550 and 1844. On votive portraits, see Matei Cazacu and Ana Dumitrescu, "Culte dynastique et images votives en Moldavie au XVe siècle: Importance des modèles serbes," *Cahiers Balkaniques* 15 (1990): 13–102; Elena Firea, "Concepţie dinastică în tablourile votive ale lui Petru Rareş," *Ars Transsilvaniae* 14/15 (2004): 143–61.

32 On the topic of Christ's miracles, see Maria Alessia Rossi, "Christ's Miracles in Monumental Art in Byzantium and Serbia (1280–1330)" (PhD dissertation, Courtauld Institute of Art, 2017).

the interior and exterior paintings, the exterior of the *naos* shows images in a more iconic mode (Figures 18.3 and 18.4). Here, around the exterior walls of the triconch, five registers present figures arranged in a hierarchical fashion, beginning with monks and hermits at the bottom, followed by martyrs, apostles, prophets, and finally angels. These full-length figures direct their attention toward the east, as if partaking in a procession around the building that culminates at the axis of the altar window with a now-damaged image of the Virgin and Child enthroned among angels. The kinds of exterior images found on the Moldavian churches would have welcomed a circumambulation of the monuments in the context of certain liturgical ceremonies, such as those that occurred (and still do today) during the Easter celebrations, for example.[33]

Among the rest of the scenes painted on the exterior of the Moldavian churches, Christological and Mariological iconographies take center stage. At Probota, the south wall of the *katholikon* displays the best-preserved exterior frescoes of the building. The burial chamber received a monumental scene of the *Tree of Jesse* (Figure 18.2).[34] This image type traces the genealogy of Christ, and in particular his human lineage, through Jesse, his son David, the kings of the Old Testament, and then finally through the Virgin Mary. The Moldavian renditions of this iconography also show narrative vignettes of prophetic moments from the Old Testament and full-length depictions of Greek philosophers, such as Plato and Aristotle, whose texts were read as containing allusions to the coming of Christ.[35] At Probota they are shown in a horizontal register along the bottom of the *Tree of Jesse* mural, whereas in other instances the figures are represented standing in vertical registers to either side of the scene. The elaborate representations of the *Tree of Jesse* were both genealogical and prophetic in content, and were intended to highlight first and foremost the notion of lineage—that of Christ in the painted representation, and that of

33 For a brief consideration of the ritual dimensions of the Moldavian churches that welcomed circumambulatory ceremonies, see Alice Isabella Sullivan, "Visions of Byzantium: The Siege of Constantinople in Sixteenth-Century Moldavia," *The Art Bulletin* 99, no. 4 (December 2017), 49–51, esp. fig. 25.

34 On this image type, see Michael D. Taylor, "Three Local Motifs in Moldavian Trees of Jesse, with an Excursus on the Liturgical Basis of the Exterior Mural Programs," *Revue des Études Sud-Est Européennes* 12 (1974): 267–75; idem, "A Historiated Tree of Jesse," *Dumbarton Oaks Papers* 34/35 (1980–81), 125–76.

35 For a detailed consideration of the literary sources that explain the inclusion of the ancient Greek philosophers in the Moldavian murals, and the meanings of the texts they carry on their individual scrolls, see Constantin Ion Ciobanu, *Stihia Profeticului: Sursele literare ale imaginii "Asediului Constantinopolului" și ale "Profeților" înțelepților antichității din pictura murală medievală Moldavă* (Chișinău, 2007), 125–309.

the prince (or patron) and his family members buried in the space extending beyond the painted exterior.

In addition to the *Tree of Jesse*, the exterior south wall of the church at Probota, as in other Moldavian churches, shows imagery drawn from the *Akathistos Hymn* (Figure 18.2). As the oldest performed hymn dedicated to the Virgin Mary sung in the Eastern Christian Church, the Akathistos was often represented in 24 scenes that illustrated its 24 stanzas.[36] Like the Hymn, the murals of the Akathistos celebrate the important events in the life of the Virgin, praising her role in the Incarnation, Redemption, and their mysteries. The Akathistos eventually evolved into a war hymn believed to bring divine protection to the Byzantine capital during moments of struggle, and, by extension, to the entire empire. During the later Palaiologan era, and in particular after the fall of the Byzantine Empire in 1453, the representations of the Akathistos acquired historical dimensions and came to incorporate scenes depicting the *Siege of Constantinople* that show the Byzantine capital saved through divine interventions.[37] At Probota, this scene appears prominently framed by the two large windows of the *pronaos*. In drawing on older Byzantine sources, this powerful, multilayered story of divine aid in the fight against non-Christian enemies functioned as a pictorial commentary on the continuing Ottoman threat against Moldavia's independence, political stability, and religious identity. The scene was painted on the exterior of several Moldavian *katholika*, and situated above eye level and close to the main entrance to the church.[38] This location suggests that the image had a crucial message of protection and salvation to convey to the faithful who entered and left the church.

Although the murals of the north and west façades of Probota are badly damaged, certain scenes remain legible, including moments from the *Life of Saint Anthony* and the *Mission of the Apostles* on the north wall. The west façade received scenes from the *Life of Saint Nicholas* to whom the church is

36 Significant studies on the Akathistos Hymn and its illustrations include: Irineu Crăciunaș, "Acatistul Maicii Domnului în pictura exterioară din Moldova," *Mitropolia Moldovei și Sucevei* 48, nos. 5–6 (1972): 297–340; Casian Crăciun, *Reprezentarea imnului Acatist în iconografia moldovă din secolul al XVI-lea* (Galați, 1999); Leena Mari Peltomaa, *The Image of the Virgin in the Akathistos Hymn* (Leiden, 2001); Ioannis Spatharakis, *The Pictorial Cycles of the Akathistos Hymn for the Virgin* (Leiden, 2005); Constantin Ion Ciobanu, "L'iconographie de l'Hymne Acathiste dans les fresques de l'église St. Onuphre du monastère Lavrov et dans la peinture extérieure moldave au temps du premier règne de Petru Rareș," *Revue Roumaine d'Histoire de l'Art, Série Beaux-Arts* 47 (2010): 3–24.

37 Sullivan, "Visions of Byzantium," 31–68.

38 Sullivan, "Visions of Byzantium," n. 9.

FIGURE 18.9 Moldavia (modern Romania), Probota Monastery, Church of Saint Nicholas, 1530–35: Last Judgment, interior of exonarthex
PHOTO: SILVIU CLUCI

dedicated, thus reserving a prominent location to the life and deeds of the monastery's patron saint. In other monuments, it is the *Genesis Cycle* that is shown on the western exterior wall and intended to draw a direct link to the scene of the *Last Judgment* painted on the entire interior of the *exonarthex* (Figure 18.9). This space serves as one of transition between the natural world outside and the sacred interior of the church that, in turn, is further charged visually and spatially. The scene of the *Last Judgment* in the narrow and intimate space of the *exonarthex* offers a monumental and vivid reminder of what will come at the end of times, with salvation ensured through the church proper. As exemplified at Probota and elsewhere, the architecture, image cycles, and ritual performances were carefully conceived in dialogue in order to choreograph sacred space and the varied experiences of those present.

3 Gothic Forms in the Carpathian Regions

Whereas some of the distinctive features of the *katholikon* at Probota present unmistakable links to Byzantine and Slavic architectural traditions, others follow Gothic models evident in church architecture in parts of central and

western Europe.[39] These include, most notably, the distinctive roofs, the buttresses, as well as the window and door framings and tracery configurations.

First, the subdivisions of the roof in the church at Probota—with steep slopes and large, smooth eaves following up the undulating line of the apses—finds a visual parallel in the Saxon churches of Transylvania that carry partitioned roofs with individual sections covering the chancel and the nave separately. The Moldavian church roofs have been reconstructed beginning at the end of the 19th century, and so their original materiality has been lost.[40] The few Romanian scholars who have considered the original form and appearance of the Moldavian church roofs of the 15th and 16th centuries have revealed that these were covered either with shingles, or lead, or perhaps colored ceramics.[41] The archaeological evidence has led to the conclusion that the majority of the Moldavian roofs from this period were finished with colored tiles.[42] This would have given these buildings a very distinct appearance.

Archaeological investigations have also unearthed evidence that this was the case with Stephen III's churches. The digs that took place at the Church of Saint Elijah in Suceava between 1997 and 1999 uncovered remnants of ceramic tiles that likely covered the original roof of the building.[43] The reconstruction of the roof of the Church of Saint George at the Monastery of Saint John the New in Suceava, completed between 1904 and 1910, furnishes an idea of how the Moldavian church roofs may have initially looked. These polychrome tiled roofs were in fact characteristic of central European churches, as evident at the Church of Our Lady (also known as Matthias Church) in Buda, rebuilt in the second half of the 14th century (and substantially rebuilt in the 19th century).[44] The roof of this building was covered with richly colored and

39 On the topic, see Gheorghe Balș, "Influence de l'art gothique sur l'architecture roumaine," *Bulletin de la section historique de l'Académie Roumaine* 15 (1929): 9–13; Hermann Fabini, "Le chiese-castello della Transilvania ed i monasteri fortificati Ortodossi della Moldavia in Romania," *Castellum: Revista dell'Istituto italiano dei castelli* 46 (2004): 7–22.

40 The architectural models represented in the votive murals in the interior of the churches have been used as visual models during these reconstructions.

41 See I. Popescu Cilieni, *Învelișurile vechilor noastre biserici* (Craiova, 1945); Balș, *Bisericile lui Ștefan cel Mare*, 191–94; Paraschiva-Victoria Batariuc, "Acoperișul bisericilor din secolele XV–XVI din Moldova," *Ars Transilvaniae* 14–15 (2004–05): 35–50, esp. 40–43.

42 Batariuc, "Acoperișul bisericilor din Moldova," 35–50, esp. 42.

43 Paraschiva-Victoria Batariuc, "Cercetarea arheologică, condiție a restaurării, Studiu de caz: Biserica Sfântu Ilie, Suceava," in *Monumentul – Tradiție și viitor*, ed. Silviu Văcaru and Aurica Ichim, 1st ed. (Iași, 2000), 140.

44 See Péter Farbaky, *Matthias Church: The Church of Our Lady in Buda Castle through the Centuries (1246–2013)* (Budapest, 2015).

ornately patterned glazed roof tiles, as is the now-reconstructed roof of Saint Stephen's Cathedral in Vienna.

Like the partitioned roofs, the three-tier buttresses on the exterior of the *katholikon* at Probota find visual parallels in Gothic buildings, most notably in nearby Transylvania and Hungary. The Church of Saint Michael in Sopron, Hungary (*c.*1280), and the Black Church in Braşov (*c.*1380) offer apt comparisons. At Probota and elsewhere, the buttresses rise about two-thirds up the building to either side of the lateral apses of the *naos* and at the corners of the *exonarthex*. Interestingly, the Moldavian churches of the later 16th century, such as the Church of the Ascension at Galata Monastery built between 1582 and 1584, likewise display buttresses around the exterior but these are significantly smaller and shorter, extending only about halfway up the building and presenting a distinct sectional configuration.[45] Therefore, it becomes evident that it is only in select churches built under Peter's patronage—and in particular in his princely mausoleum at Probota—that we encounter three-tier large buttresses around the exterior of the edifices. Given the thickness of the walls of these Moldavian churches, however, the buttresses need not to be as tall and as thick as they are, suggesting that the function of these features extended beyond the structural into the symbolic in Peter's buildings.

The most distinctive features of the *katholikon* at Probota drawn from Gothic models are the door and window framings and the window tracery. Variants of the *Spitzbogenportal* and the *Schulterbogenportal* stand at the thresholds, and the larger windows of the *pronaos* and *exonarthex* display two lancets with various tracery configurations (Figures 18.3, 18.8 and 18.9).[46] The west portal leading into the *pronaos* of the churches is adorned with concentric and receding pointed arches that provide a sense of guidance and direction into the *pronaos* of the church for the faithful. At Probota, moreover, as in other contemporary churches, the arch is additionally contained within a richly profiled rectangular frame. These types of Gothic portal frames with uninterrupted profiles and a tympanum above the main entrance were predominant in Gothic buildings found throughout central and western Europe. An elevation drawing of a portal of this type from southern Germany, dating to 1446, is preserved in the Graphic Collection of the Akademie der Bildenden Künste in Vienna and provides a

45 Sullivan, "The Painted Fortified Monastic Churches of Moldavia," 733–34.

46 See Balș, "Influence de l'art gothique sur l'architecture roumaine," 10. The Graphic Collection of the Akademie der Bildenden Künste in Vienna preserves comparable examples. See Johann Josef Böker, *Architektur der Gotik: Bestandskatalog der weltgrößten Sammlung an gotischen Baurissen* (*Legat Franz Jäger*) *im Kupferstichkabinett der Akademie der bildenden Künste Wien* (Vienna, 2005), esp. 307, 316, 325, 337.

point of comparison with the Moldavian renditions.[47] Architectural drawings and ideas derived from Gothic models would have thus circulated in medieval lodges of stone masons and architects, informing practices of building construction across Eastern Europe. The architectural lodge of Saint Stephen's Cathedral in Vienna, led by the architects Hanns Puchsbaum and Lorenz Spenning, served as the leading lodge for much of the 15th century. Spenning was among the professional architects present at the 1459 Regensburg Congress (*Regensburger Bauhüttentagung*) that was intended to regulate practices and rules governing building construction among all affiliated lodges.

In the church interiors, the thresholds between the different spaces are marked by narrow portals characteristic in shape of the *Kragsturzbogenportal*, yet framed by interlocking rectilinear elements (particularly visible in the upper corners) that render the entryways more akin to the famous Gothic *Schulterbogenportal*. This type of doorway framing was particularly favored during the 15th century, with more rounded forms replacing the rectilinear ones in later monuments, as evident at Probota. These kinds of portals once again find close parallels in churches from Transylvania, such as the famous Black Church in Braşov (especially the south portal), and the west portal of the Church of the Virgin at Biertan (Birthälm) (Figure 18.10).[48] It appears that the *Schulterbogenportal* was favored for main entrances in the Transylvanian and other east-central European churches, whereas in the Moldavian monuments they are always found at the thresholds between the various spaces inside the buildings. Given the strong economic contacts that Moldavia's princes fostered with the communities in Transylvania, Poland, and Hungary, masons trained in workshops that generally followed Gothic building practices and designs were summoned to Moldavia to work on royal projects.[49]

Although little information survives about the masons who worked on the Moldavian churches, certain stonecutters were trained in workshops that generally followed western and central European Gothic building practices and

47 Böker, *Architektur der Gotik*, 307 (fig. 16.996).

48 Hermann Fabini, "Restaurarea bisericii Negre din Braşov," *Revista Monumentelor Istorice* 59, no. 2 (1990): 75–80; idem, "L'église de Biertan en Transylvanie," *Monuments historiques* 169 (1990): 80–83. Similar Gothic portals are found at the churches at Dârlos, Malancrav, and the Franciscan cloister in Cluj-Napoca in Transylvania, for example.

49 It is known that Stephen III fostered economic relations with the city of Braşov and other nearby Transylvanian regions during his long reign, and even built two churches in the towns of Vad and Feleac that draw from Byzantine and Gothic church building traditions. His heirs continued the relations with Moldavia's western neighbors. See Marius Porumb, *Ştefan cel Mare şi Transilvania: Legături culturale şi artistice moldo-transilvanene în sec. XV–XVI* (Cluj-Napoca, 2004), esp. 18–25.

FIGURE 18.10 Biertan (Birthälm), Transylvania, modern Romania, 1486–1524: Portals, Church of the Virgin
PHOTO: HORIA VARLAN; WIKIMEDIA COMMONS

designs. From the first half of the 15th century, we know that Polish-Lithuanian masons worked in Moldavia, and in particular at the restoration of the fortress at Cetatea Albă in 1421.[50] From the first half of the 16th century, there are also some known individuals, though few in number. One figure, a certain

50 Mihai Costăchescu, *Documente moldovenești înainte de Ștefan cel Mare* (Iași, 1931–32), 2:616; Corina Nicolescu, "Arta în epoca lui Ștefan cel Mare: Antecedentele și etapele de dezvoltare ale artei moldovenești din epoca lui Ștefan cel Mare," in *Cultura moldovenească în timpul lui Ștefan cel Mare*, ed. Mihai Berza (Bucharest, 1964), 281.

"Master Battista" worked at Stephen III's court.[51] Another individual, Ioan Zidarul (John the Mason) from Bistrița in Transylvania, was summoned to Peter's court to work on his ecclesiastical projects, especially the Church of Saint Demetrios in Suceava, begun in 1534, which emulates Peter's princely mausoleum at Probota.[52]

The mode of construction of the *katholikon* at Probota, using mainly quarried stone, also emulates the building techniques found in Gothic civic and religious structures.[53] Saxon colonies that settled throughout Transylvania beginning in the 12th century built churches following Gothic principles and designs. Such buildings existed also in Moldavia in the cities of Rădăuți, Baia, Chilia, and Siret, for example. During the second half of the 14th century, the Latin presence in the context of which monuments of a Gothic type were erected was evident in Moldavia. In 1370, for example, a Roman episcopate was established in the city of Siret.[54] During the 14th century, the village of Baia was home to two Catholic buildings; the remains of one Latinate cathedral built sometime in the 13th century and partially rebuilt in 1410 under Prince Alexander I (r. 1400–32) still stand today.[55] The cathedral in Baia was the largest Catholic building in Moldavia at the time. Alexander's wife, Margareta, was a Catholic of Polish descent and likely contributed to the cathedral's rebuilding campaign. Baia was also home to a Franciscan church and a Dominican church built sometime in the 13th century and mentioned in a document from 1337.[56] In Chilia, a Franciscan monastery was constructed sometime between 1334

51 His gravestone, now preserved in the National History Museum in Bucharest (inv.72543), hails from Suceava and carries the inscription in Latin around its perimeter "Dominus Battista Vessentino magister artibus 1512." *Civilizația epocii lui Ștefan cel Mare 1457–1504*, Exhibition Catalog (Bucharest, 2004), 157.

52 On the figure of Alexandru Lăpedatu, "Ioan Zidarul lui Petru-Vodă Rareș," *Buletinul Comisiunii Monumentelor Istorice* 5 (1912): 83–86; Vasile Ilovan, "Casa 'Ioan Zidarul' din Bistrița," *File de Istorie* 3 (1974): 190–96; Ana Maria Orășanu, "Une maison patricienne de Bistriza au XVIe siècle 'La maison de Ion Zidaru,'" *Revue Roumaine d'Histoire* 15, no. 1 (1976): 57–69.

53 See Vasile Drăguț, "Introducere. I: Arhitectura religioasă, pictură murală," in *Monumente istorice bisericești din Mitropolia Moldovei și Sucevei* (Iași, 1974), 10.

54 Carol Auner, "Episcopia de Siret (1371–1388)," *Revista catolică* (1913): 226–45.

55 Nicolae Grigoraș and Ioan Caproșu, *Biserici si mănăstiri vechi din Moldova: până la mijlocul secolului al XV-lea*, 2nd ed. (Bucharest, 1971), 58–62.

56 See Claudia Florentina Dobre, *Mendicants in Moldavia: Mission in an Orthodox Land; Thirteenth to Fifteenth Century* (Daun, 2009); Gábor Klaniczay, "The Mendicant Orders in East-Central Europe and the Integration of Cultures," in *Hybride Kulturen im mittelalterlichen Europa*, ed. Michael Borgolte and Bernd Schneidmüller (Berlin, 2010), 245–60.

FIGURE 18.11 Moldavia (modern Romania), Bogdana Monastery, Rădăuți, Church of Saint Nicholas, *c.*1360: view from northwest
PHOTO: A. I. SULLIVAN

and 1390.[57] These buildings informed the design and construction methods of the first masonry buildings in the principality.

In fact, the earliest still extant masonry church in Moldavia to preserve the distinctive Gothic features outlined above—such as the large buttresses against the exterior walls, and the window and door framings, etc.—is the Church of Saint Nicholas at Bogdana Monastery in Rădăuți (Figure 18.11).[58] This church dates to *c.*1360, to a period when Moldavia was gradually affirming its religious independence from Poland and Hungary, although it continued to maintain political, economic, and cultural ties with these kingdoms and their sprawling lands for centuries to come. Whereas the *katholikon* in Rădăuți displays affinities with east-central European Gothic architecture, the interior space is modeled on that of Byzantine churches. The interior is thus divided

57 Constantin I Andreescu, "Așezări franciscane la Dunăre și Marea Neagră în sec. XIII–XIV," *Cercetări istorice* 8–9, no. 2 (1932–33): 154–61.

58 Sullivan, "The Painted Fortified Monastic Churches of Moldavia," 653–54; Lia Bătrâna and Adrian Bătrâna, *Biserica "Sfântul Nicolae" din Rădăuți: Cercetări arheologice și interpretări istorice asupra începuturilor Țării Moldovei* (Piatra Neamț, 2012).

into a closed *exonarthex*,[59] a *pronaos*, a *naos*, and a semicircular apse. The church, thus, presents a surprising combination of a Byzantine church interior with various Gothic architectural and aesthetic elements. In essence, Saint Nicholas in Rădăuți looks like an early Christian basilica, yet it is adapted to the needs and requirements of the Orthodox rite, presenting, for instance, a thick transversal wall in between the *naos* and *pronaos*, and an interior that is dimly lit and richly painted.[60] Although Romanian scholars have put forth the argument that these disparate elements came together in the churches that date to Stephen III's reign, offering local adaptations of different Gothic, Byzantine, and Slavic models,[61] church architecture in Moldavia, and especially in a monastic context, did not crystalize until the first half of the 16th century during the reign of Peter Rareș with the princely mausoleum at Probota as a key monument representative of these new developments.

4 Eclectic Architecture on the Margins of Europe

From architectural and also, to some degree, iconographic standpoints, the Moldavian corpus of ecclesiastical monuments from the early decades of the 16th century displays an eclectic array of features with roots in various church building and decorating traditions, alongside aspects of a local character. On the one hand, the layout of the churches and the nature of their interior spaces, dimly lit and with extensive image cycles entirely covering the walls, have affinities with Byzantine-Slavic church architecture and building traditions. Some of the other features of the edifices, on the other hand, such as the thick walls, the large buttresses set against the exterior, the design of the roofs, the curvilinear Late Gothic tracery of the windows, and the receding pointed arches and overlapping rectilinear forms present in the door frames, follow central and western European Gothic models. The particular vaulting systems of the *naos*, and sometimes the *pronaos*, developed in a Moldavian context as a result of aesthetic and spiritual desires. Characteristics such as the elongation of the church toward the west by the addition of the burial chamber in between the *naos* and *pronaos*, and the *exonarthex* at the west end, took form

59 The exonarthex was added only in 1559 by Prince Alexander Lăpușneanu (r. 1552–61; 1564–68).

60 Bătrâna and Bătrâna, *Biserica "Sfântul Nicolae" din Rădăuți*, 309–55 (for an overview of the interior iconographic program). The interior mural program has been restored most recently between 2017 and 2020.

61 Nicolescu, "Arta în epoca lui Ștefan cel Mare," 285; Drăguț, "Introducere. I: Arhitectura religioasă, pictură murală," 12.

locally as well, during the initial decades of the 16th century, and in response to particular liturgical, paraliturgical, and funerary needs. The stylistic plurality of the Moldavian churches, however, is not an isolated phenomenon in the Eastern European cultural context.

The Balkan Peninsula offers additional zones of generative creativity in which the artistic and architectural output reflected contemporary dynamics of cultural contacts and the delicate dialogue between the visual and the political dimensions of princely patronage in the ecclesiastical sphere at key historical moments.[62] The churches built under princely patronage between the 12th and the 14th centuries in Serbia, for example, demonstrate a visual eclecticism with respect to Romanesque, Gothic, and Byzantine building and decorating traditions.[63] But whereas in Serbian monastic churches the western architectural and stylistic features appear mainly on and around the western façades of the buildings and are evident in the general exterior shapes of the monuments, the monastic churches constructed north of the Danube River display western architectural and decorative forms alongside Byzantine, Slavic, and local models of a different visual valence. Indeed, the Moldavian churches reveal similarities with western, Byzantine, and Slavic church building traditions that differ in their eclectic conception from the Serbian and Bulgarian architectural examples. The more direct contacts that extended between Moldavia and neighboring regions such as Transylvania, Hungary, and Poland, as well as local workshop practices in the region, may explain the diverse architectural idioms evident in the ecclesiastical monuments that incorporate western architectural forms alongside Byzantine, Slavic, and local building traditions with various and differing visual and spatial results.

The stylistic pluralism of the Moldavian churches is certainly not unique for Eastern Europe, nor for the period of the 15th and 16th centuries. Ethan Matt Kavaler, for example, has addressed the compound character, or "synthetic order," of central European buildings from around the first decades of the

62 On aspects of how the visual vocabulary of the Moldavian material relates to that of Serbia and Bulgaria, see, for example, Alice Isabella Sullivan, "Architectural Pluralism at the Edges: The Visual Eclecticism of Medieval Monastic Churches in Eastern Europe," *Studii de Istoria și Teoria Arhitecturii / Studies in History and Theory of Architecture* 4 (2016): 135–51. See also, Ida Sinkević, "Serbian Royal Mausolea: A Quest for Cultural Identity," in *Eclecticism in Late Medieval Visual Culture at the Crossroads of the Latin, Greek, and Slavic Traditions*, ed. Maria Alessia Rossi and Alice Isabella Sullivan (Berlin, 2021), 57–76.

63 This is evident, for example, at Saint Nicholas Monastery, Kuršumlija, Serbia, founded *c.*1166–68, or at Djurdjevi Stupovi Monastery, Serbia, founded *c.*1166–*c.*1170.

16th century that present adaptations of both Gothic and classical styles.[64] Although some patrons favored one mode of construction and decoration of their edifices over another—whether Gothic or Italianate—it is clear throughout Europe that others opted for a more "hybrid accommodation."[65] This was the case in Moldavia as well, as the surviving monuments demonstrate, but the presence of the Gothic elements on the Moldavian churches, as well as their meanings and functions, may be the result of more than just the desires of the patron. And it is worth remembering here the fact that the Gothic forms present in the Moldavian churches of the late 15th and early 16th centuries are not the complex and vibrant flamboyant forms of La Trinité in Vendôme from *c.*1500, for example, but more subdued, perhaps even practical, elements found mainly in door and window framings, as well as in window tracery. As such, the Gothic features follow a historical rather than contemporary style, either the result of local workshop practices and know-how, or due to a deliberate choice on the part of the patron. The closest contemporary models, apparent in the Gothic buildings of nearby Transylvania, did not exhibit the highest level of design for the time, but offered nevertheless relevant models.

The Gothic forms employed on the Moldavian churches of the late 15th and early 16th centuries find an intriguing parallel in the ways in which classical elements were introduced to enhance the exteriors of Muscovite churches of the same period.[66] In 1474, for example, Tsar Ivan III (r. 1462–1505) summoned the Bolognese military architect Aristotele Fioravanti to come and work on the walls of the Kremlin. While in Moscow, Fioravanti also contributed to the design of the Cathedral of the Dormition in the Kremlin (1474–79)—hailed as the first work of the "Renaissance" in Moscow.[67] The painting tradition was not affected at all by Italian conventions, and architecturally, Italian forms were articulated only as part of the exterior decoration in the Cathedral of the Dormition. By the early decades of the 16th century, another wave of north Italians made their way to Moscow and this time not from Bologna or Milan, but from Venice. Alesio Novi is one such Venetian architect who came to Moscow to work on the Cathedral of the Archangel Michael, also in the Kremlin (*c.*1505–09) (Figure 18.12).[68] The cathedral follows the Byzantine plan established locally in the 11th century, but it is much more rectangular and

64 Ethan Matt Kavaler, *Renaissance Gothic: Architecture and the Arts in Northern Europe, 1470–1540* (New Haven, 2012), 240.

65 Kavaler, *Renaissance Gothic*, 255.

66 Dimitry Shvidkovsky, *Russian Architecture and the West* (New Haven, 2007), 73–122.

67 Shvidkovsky, *Russian Architecture and the West*, 85–91.

68 Shvidkovsky, *Russian Architecture and the West*, 99–107.

FIGURE 18.12 Kremlin, Moscow, Cathedral of the Archangel Michael *c.*1505–09: view from the northeast
PHOTO: FEDOR CHELNOKOV; WIKIMEDIA COMMONS

elongated in shape. The interior continues to be decorated with the traditional Byzantine scheme, but the exterior presents many more Italianate features. For example, it has the lateral sides divided into five rounded arches with a prominent cornice running about mid-way up the building, and engaged fluted columns and capitals of the classical orders. The upper sections of the rounded arches of the façade display scallop-shell lunettes reminiscent of the ones present on Venetian buildings, such as San Marco. This visual eclecticism developed alongside local traditions, but the element of the local (with deep roots in Byzantine forms) remained strong. In both the Moldavian and the Muscovite churches, appropriate Gothic and Classical elements, respectively, appear in decorative elements that do not affect the primary function of the religious edifice.

Indeed, the interior spaces of medieval Eastern Christian *katholika* (Muscovite, Moldavian, and elsewhere) had to be properly designed for Orthodox monastic use, creating the religiously appropriate environment for liturgical celebrations. Therefore, the architectural forms and spatial solutions with roots in various church building traditions and adapted in the Moldavian monastic churches in particular, did not take away from the prescribed form and function of the religious buildings. Rather, the Gothic forms supplemented visually the predominantly Byzantine structure, form, and functions of the churches. A pragmatic explanation for the presence of Gothic elements in the Moldavian churches is offered by workshop practices in the region and the presence of stonecutters from among Transylvanian Saxons to the east of the Carpathians. The Gothic forms that persisted unchanged over more than a century employed in the Moldavian churches stood out less prominently against the Eastern Christian structure of the buildings and their extensive image cycles. Another hypothesis, however, points to the symbolic purchase of the Gothic elements. Certainly, the variety of Gothic features on the Moldavian churches could be interpreted as a symbolic alignment of Moldavia with the Christian world of western Europe for which the Gothic signaled the Christian form *par excellence*. As such, the Gothic forms may have been adapted for practical and/or symbolic reasons, and also in response to certain desires on the part of the patron and his council, as well as the community at large.

5 Context, Function and Implications

The new visual rhetoric of Peter Rareș's churches was the result of his careful planning in communication with his advisors, among them the metropolitan bishop of Moldavia at the time, Grigore Roșca (in office 1546–51). A former monk at Voroneț Monastery and then abbot of Probota Monastery (1523–46), Roșca served as one of Peter's primary counselors.[69] As a contemporary Russian messenger who spent five months at Peter's court in Suceava recounts, the Moldavian prince demonstrated "a learned philosophical wisdom" since he was being advised "by many other wise philosophers and masters."[70] For one thing, Roșca

69 According to Roșca's follower, Metropolitan Dosoftei, who referred to him as "the cousin of Peter Rareș." Maria Magdalena Székely, *Sfetnicii lui Petru Rareș: Studiu prosopografic* (Iași, 2002), 172. Roşca was also a disciple of Daniil Sihastru and worked in the shadow of Metropolitan Teoctis I, Stephen's advisor. Gheorghe Mândrescu, "Grigorie Roșca: Contribuții privind participarea sa la realizarea programului de construcții din epoca domniilor lui Petru Rareș și Alexandru Lăpușneanu," *Acta Musei Napocensis* 20 (1983): 527–30, esp. 528.

70 Gheorghe Bezviconi, *Călători Ruși în Moldova și Muntenia* (Bucharest, 1947), 30.

played a major role in encouraging Peter to build a new princely funerary foundation at Probota, just as his father Stephen III had done before at Putna Monastery.[71]

Yet, Peter's efforts to establish Probota as a new princely mausoleum generated a great disturbance and was contested by the community of monks at Putna.[72] Although not altogether popular, Peter's decision elevated the status of Probota to one comparable to that of his father's mausoleum. He buried his first wife Maria (d. 28 June 1529) in the *pronaos* at Putna, but Maria's burial was the last princely grave in Stephen's funerary church. By 1530, the new sumptuous *katholikon* at Probota was raised and Peter's dynastic lineage was given its own resting place. Moreover, it is not out of the question that Stephen may have first thought of Probota as his family mausoleum, especially since his mother Oltea and his first wife Evdochia had both been buried there in the older church (1465, 1467).[73] These important burials rendered Old Probota as a significant monastic site for Peter as well, whose mother raised him on her own and enabled his ascent to the throne.[74] However, the shaky terrain onto which Old Probota was built likely contributed to its relocation.

In the burial chamber at Probota, the graves of Peter Rareș, his second wife Elena (d. 1552), and their son Stephen VI (d. 1552) line the central corridor leading to the *naos*.[75] The graves are marked by rectangular stone slabs with geometric and floral designs and surrounding carved dedicatory inscriptions in Church Slavonic. Consciously, it seems, these texts were designed to encourage physical and mental circumambulation of the graves while reading them. Directly beyond the burial room, in the *naos* of the church, the votive mural on the west wall features the portraits of the very individuals buried in the funerary chamber beyond—Peter, his wife, and children. As such, the votive painting in the *naos* at Probota would have reminded the faithful, upon crossing the threshold into the space of the burial chamber, of the founders and

71 See Maria Crăciun, "Burial and Piety in Comparative Perspective: Moldavia during the 15th and 16th Century," in *Studii Istorice: Omagiu Profesorului Camil Mureșanu la împlinirea vârstei de 70 de ani*, ed. Nicolae Edroiu (Cluj-Napoca, 1998), 119.

72 See *Holy Putna Monastery*, 55, and n. 66 citing *Documenta Romaniae Historica*, VI, 557.

73 Bătrâna and Bătrâna, "O primă ctitorie și necropolă voievodală datorată lui Ștefan cel Mare: Mănăstirea Probota," 205–29.

74 According to legend, after the death of Stephen the Young, Stephen III's grandson and last legitimate heir, the Moldavian boyars gathered to mourn the death of their prince and discuss who the next leader of Moldavia should be. At that time, Peter's mother, Maria Răreșoaia of Hârlău, came to them with a charter from Stephen that excused her of her taxes and acknowledged Peter Rareș as his son. On the basis of this document the boyars unanimously elected Peter to the throne of the principality. See Ştefan S Gorovei, *Petru Rareș* (Bucharest, 1982); Székely, *Sfetnicii lui Petru Rareș*.

75 For Peter's grave inscription, see Iorga, *Inscripții*, 1:56–57 (Church Slavonic; Romanian).

their graves—the very individuals under whose patronage the monastery was built and whom they were to keep in their thoughts and prayers.

But in addition to commemorating the patrons of the church and encouraging financial support from the laity, these votive images enabled the commissioners, visually and symbolically, to be present in the church during the liturgical celebrations and remind the monastic and lay individuals of the donors and their deeds. Their names would have thus been regularly mentioned and remembered during rituals. The extant inscription carved in the *proskomidi* niche of the altar of the church at Probota preserves a good example of these desires. The inscription calls for Peter's eternal remembrance and that of family members of his princely line:

> Remember, God, the souls of your servants John Stephen voivode and his son John Peter voivode, and his [Stephen's] mother, Maria, and his wife, Maria, and their children, and his [Peter's] wife Elena, and their children, and Maria and Ana [Peter's sisters]. Remember, God, the soul of your servant, hieromonk kyr Grigorie [Roșca] hegumenos.[76]

The text of the inscription itself was probably not so much a reminder to God to remember the princely family, but to succeeding generations of clergymen and nuns who were to celebrate the Divine Liturgy at this site long after the donor and his family died. The desire for commemoration through texts and images stresses the importance for the church founders and later patrons to be perpetually present and remembered by the faithful and in particular the monastic and lay communities who regularly participate in the Orthodox celebrations carried out at the site.

With his princely mausoleum at Probota, Peter established a new spatial and visual vocabulary for church architecture in Moldavia. The blending of architectural styles evident in the building speaks both to the developments in church architecture in the region in the preceding decades, as well as future changes. It seems that each Moldavian ruler, as is the case in other corners of the late medieval and early modern world, left his own mark on the local style and contributed to the further transformations of the local sacred landscape. Indeed, the distinct and innovative architecture of Probota enabled the further transformations that were to take place in Moldavian monastic church architecture and its mural decoration during the later decades of the 16th century.

76 Iorga, *Inscripții*, 1:57 (Church Slavonic; Romanian).

6 Coda

Probota Monastery and its distinctive *katholikon* dedicated to Saint Nicholas were transformed over time, and only a glimpse of their former splendor survives today. During the 18th century, for instance, the Gothic windows of the *exonarthex* were closed off and those of the *pronaos* diminished in size (Figure 18.13).[77] The monastery was closed in 1864 and the church served only as a parish for the local villages. During this time, several restoration campaigns took place, in 1928–39 and 1975–77, intended to restore the church and its surrounding buildings. The effort of the early decades of the 20th century brought back to light most notably the Gothic windows of the *exonarthex* and *pronaos* (Figure 18.14).[78] These projects sparked an interest among historians in the ecclesiastical architecture of the region. During the 1920s and 1930s, Gheorghe Balș, Ion D. Ștefănescu, and Paul Henry published in Romanian and French a series of separate major studies on the late medieval religious architecture of Moldavia.[79] These publications generally took the form of chronological catalogs with black and white photographs, plans and elevations, as well as layouts of various monastic complexes. Primarily formal and archaeological in nature, these pioneering studies did not yet engage with the full range of historical contexts that contributed to the making and shaping of the buildings under scrutiny, nor with the relationships between the architecture, images, and rituals of the buildings. In 1990, after the revolution that overthrew the Communist regime in Romania, Probota Monastery reopened as a convent. In 1993, the Church of Saint Nicholas was listed by UNESCO as a World Heritage Site. Between 1996 and 2001 an extensive project of restoration supported by UNESCO and the Japanese Funds-in-Trust for the Preservation of the World Cultural Heritage restored the building and revealed aspects of its rich yet turbulent past.[80]

77 Elo and Dean, eds., *The Restoration of the Probota Monastery*, 18–19.

78 The restoration documents of Probota Monastery from this period are preserved in the Archive I.N.P. of the Commission of Historical Monument (C.M.I), and online (inv. 2796), accessed 10 July 2020, https://horia-teodoru.ro/dosare-cmi/dosare-cmi-manastirea-PROBOTA-suceava-2796.pdf.

79 Balș, *Bisericile lui Ștefan cel Mare*; idem, *Bisericile și mănăstirile moldovenești din veacul al XVI-lea*; Ion D. Ștefănescu, *L'évolution de la peinture religieuse en Bucovine et en Moldavie, depuis les origines jusqu'au XIXe siècle* (Paris, 1928–29); Paul Henry, *Les églises de la Moldavie du nord, des origines à la fin du XVIe siècle: architecture et peinture* (Paris, 1930), trans. Constanța Tănăsescu as *Monumentele din Moldova de Nord: de la origini până la sfârșitul secolului al XVI-lea* (Bucharest, 1984).

80 During this project, the much better-preserved Church of Saint Demetrios in Suceava, completed under Peter's patronage only a few years later, between 1534–35 as the chapel

FIGURE 18.13 Moldavia (modern Romania), Probota Monastery, Church of Saint Nicholas, 1530–35: view from the southwest in 1906
SOURCE: ELO AND DEAN, EDS., *THE RESTORATION OF THE PROBOTA MONASTERY* (1996–2001), 19

Monastic church architecture in Moldavia developed gradually, with certain forms taking architectonic shape as early as the last decades of the 14th century, soon after the foundation of the principality in 1359. Then new developments unfolded in individual buildings under the patronage of Stephen III during the second half of the 15th century. But what makes the architecture of the early 16th century distinctive is its sheer stylistic pluralism. The buildings display architectural features that are Byzantine and Slavic in origin (e.g., the triconch plan and its variants), others that are drawn from Gothic models (such as the buttresses and window and door framings and tracery configurations), and forms that could be characterized as Moldavian in conception (e.g., vaulting designs).

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of his princely court, served as a model for Probota's restoration. The churches are roughly the same size and similarly constructed, although Saint Demetrios lacks a funerary room. See Sullivan, "The Painted Fortified Monastic Churches of Moldavia," 720–22; Elo and Dean, eds., *The Restoration of the Probota Monastery*, 13–21.

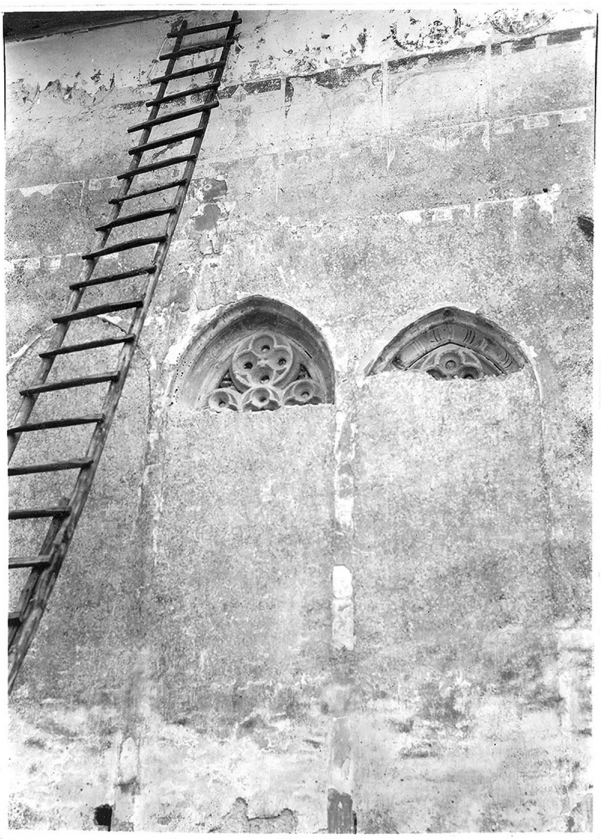

FIGURE 18.14 Moldavia (modern Romania), Probota Monastery, Church of Saint Nicholas, 1530–35: view of the exonarthex windows during the restoration in 1929
SOURCE: HORIA TEODORU ARCHIVE; HTTP://ARHITECTURA-1906.RO/WP-CONTENT/UPLOADS/2015/07/1-2015_EFIGII_AF_22.JPG

The eclecticism with respect to sources evident in the *katholikon* at Probota, and in general in the foundations of Peter Rareș, is not simply a synthesis of artistic and architectural elements drawn from distinct church building traditions. These buildings, rather, offer an adaptation and translation of select elements in order to fulfill certain needs. For instance, the desire of the patron to be buried within the church in a special burial chamber that precedes the *naos* ensured his perpetual remembrance by the faithful upon entering and leaving the church building. The Gothic elements in the churches, moreover, carry both practical and symbolic functions, being the result of workshop

practices to the east of the Carpathian Mountains and serving as a link with the more established church building traditions in the rest of Christian Europe. Therefore, the visual plurality of the Moldavian monuments is the result of cultural contact and translation as a give and take, with elements and meanings accepted, rejected, and transformed dependent on the new context(s) and the motivation(s) of the patrons, the artists, and the larger communities.

Although it is important to consider the distinctive facets of Moldavian monastic church architecture from this period and their affinities with earlier Byzantine and Gothic traditions, among others, the element of the local should not be forgotten.[81] Synthesis and translations between old and new, domestic and foreign, aristocratic and popular traditions all come into play in the development of what we may refer to as a Moldavian type of monastic architecture that prevailed in the century following the destruction of Constantinople—a type of monument that presents different kinds of responses to the crises of 1453 and to the emergence of the Ottoman Empire as a dominant force in southeastern Europe, the eastern Mediterranean, and the western Black Sea regions in the decades that followed.

In the Moldavian cultural sphere, the negotiation of different artistic traditions ought to be further examined in the context of princely patronage and in light of cross-cultural interactions and exchanges. External factors certainly contributed to the distinctive character of the Moldavian churches, as did local choices. Therefore, looking at monuments from regions with which the principality came into contact with or established relations could yield new insights into the Moldavian type of monastic church that reached a distinctive stage of development during the early decades of the 16th century under the direct patronage of Peter Rareș. Changing patterns of patronage that emerged in the new post-Byzantine sociopolitical atmosphere also contributed to the distinctive character of the Moldavian churches. Despite the lack of extensive archival documentation on builders and artists, a careful examination of the churches themselves could yield exciting insight into the cultural contacts that extended in this eastern Carpathian territory, and Eastern Europe more broadly, and the cultural negotiations that unfolded locally in the crucible of the post-1453 world.

81 Corina Nicolescu discusses the element of the "local" in relation to the artistic production of Moldavia at the turn of the 16th century. See Nicolescu, "Arta în epoca lui Ștefan cel Mare," 362.

Acknowledgements

The initial writing stages of this project were funded by the VolkswagenStiftung and The Andrew W. Mellon Foundation as part of a Postdoctoral Fellowship in the Humanities at the Dahlem Humanities Center, Freie Universität Berlin. The revision stages were carried out with support from Tufts University. I thank the editors for the invitation to contribute to this publication, and for their thoughtful comments and suggestions on an earlier draft of this essay. I am also grateful to the anonymous reviewer whose critical feedback helped me refine the argument, expand my analysis, and better contextualize the material. Unless otherwise noted, all translations into English are my own, as are any remaining errors.

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